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ABSTRACT

The Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) is a National Science Foundation program launched in 1993, designed to improve the mathematics and science education of urban students in medium-sized cities. The goals of the program, in addition to increased enrollments in mathematics and science classes, were to improve student achievement, teacher knowledge and skills, and to enhance student interest in mathematics and science careers. As the program matured, the focus shifted to standards-based curriculum, instruction, assessment, and professional development. This report highlights the achievements of the program overall and presents case studies of five selected CPMSA sites: (1) Omaha, Nebraska; (2) Jackson, Michigan; (3) Laredo, Texas; Oakland, California; and (5) Montgomery, Alabama. Data were collected from a variety of sources. Findings show that the primary goal of increasing the enrollment and successful completion of college preparatory mathematics and science courses was accomplished. Other measures of achievement also showed positive results; 12 of 17 sites with available data showed improvement in the percentage of students passing the fourth-grade mathematics test. Disparities in achievement and achievement gaps between white and minority students were narrowed. Details are provided about program success in each of the case study cities. An appendix describes overall student outcomes in 26 exhibits. (Contains 4 tables, 72 figures, and 65 references.) (SLD)

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Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA)

OVERCOMING CHALLENGES IN URBAN EDUCATION

CPMSA Achievement Highlights and Case Stories of Five Sites

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CPMSA Achievement Highlights and Case Stories of Five Sites

Systemic Research, Inc.
Jason J. Kim, Ph.D.
Linda M. Crasco

with the assistance of:
Aran Bride
Jeffrey Gilligan
William Klements
David J. Leavitt
Nadia Libbus, Research and Evaluation Associates, Inc.
Michael Louca
Jared Weiner

Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) is a K-12 educational reform program sponsored by the National Science Foundation.

Evaluative Study of the Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) based on the Tabulated Indicators for Systemic Changes (TISC) [REC-0080724].

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Reference web site: *http://www.systemic.com/CPMSA*

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EXECUTIVE SUMMARY

The Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) is a National Science Foundation (NSF) program, launched in 1993, designed to improve the mathematics and science education of urban students in medium sized cities. Initially, the major focus of the program was on the enrollment of underrepresented minority students in gate-keeping and higher level mathematics and science courses. This was to be accomplished by partnerships with colleges, universities and community organizations to design and implement both student and teacher enrichment activities. The goals of the program, in addition to increased enrollments in mathematics and science courses, were to improve student achievement, teacher knowledge and skills, and to enhance student interest in pursing mathematics, science, and technology post-secondary education and careers. As the program matured, a more systemic approach was embraced, and the focus shifted to standards-based curriculum, instruction, assessment, and professional development with the objective of improved achievement of ALL students. This report highlights the achievements of the program overall and presents case studies of five selected CPMSA sites: Omaha, NE (Cohort 95), Jackson, MI (Cohort 96), Laredo, TX (Cohort 97), Oakland, CA (Cohort 97), and Montgomery, AL (Cohort 98).

By the early 1990's it was clear that urban schools needed to provide challenging standards-based curricula and instruction. Teachers needed more extensive preparation for teaching mathematics and science, and on-going professional development in content and pedagogy. Policies needed to be strengthened and implemented to ensure that all students were receiving a rigorous education based on the belief system that all children can learn. Systemic educational reform was recognized as a necessary strategy to achieve and sustain these improvements.

Critical key indicators for successful CPMSA implementation are student achievement data including increased enrollment and successful completion of gate-keeping and higher-level mathematics and science courses, improved scores on standardized assessment tests of mathematics and science, and increased test taking rates and higher scores on college entrance examinations.

The primary goal of increasing the enrollment and successful completion of college preparatory mathematics and science courses was accomplished. For example, the Cohort 93 site increased its enrollment from 5,035 in SY 1993-94 (47% of the total grade 9-12 student population) to 8,930 (88%) in SY 2000-01. Similar gains were made in successful completion (grade C or higher). The number of students successfully completing mathematics courses increased from 3,889 (36%) to 6,319 (63%). All of the cohorts experienced gains, albeit smaller that Cohort 1. Analogous results were observed in science. For example, enrollment of students in gate-keeping and higher-level science courses in the Cohort 93 site increased from 2,284 (21% of total grade 9-12 student population) to 5,799 (57%). Completion rates paralleled the enrollment rates, increasing from 2,133 students (20%) in SY 1993-94 to 4,470 (44%) in SY 2000-01.

Other measures of achievement, especially assessment test results, also showed positive results. Fourth grade assessment test results are presented as representative examples of student achievement progress made throughout the CPMSA grant period. Comparing the passing rates of white and underrepresented minority students on mathematics tests between comparison years. Twelve of the 17 sites with available data showed overall improvement in the percentage of students passing the 4th grade mathematics test, with nine sites narrowing the achievement gap.

Another measure of student achievement is college entrance examinations. The number of students taking the examinations is an indicator of students' intention to pursue post secondary education, whereas the test results are a measure of content knowledge.

Advanced placement test results reflect those students that are ready for college level work. All but two sites increased the number of tests taken. The number per thousand of 11th and 12th graders scoring 3 or above increased in the vast majority of sites (20 out of 22).

Either the Scholastic Assessment Tests (SAT) or the American College Test (ACT) is an admission requirement of most colleges and universities. Different geographic areas of the country tend to favor one test over the other. The number of SAT test takers per 1,000 students over the life of the CPMSA program indicates that in Cohorts 96 and 97 test taking rates exceeded the national average beginning in SY 1998-99. With the exception of Cohort 93, all Cohorts improved their test taking rates. As the number of test takers increased, it became a challenge to sustain mean scores. Except for Cohort 94 in SY 1997-98, no cohorts met or exceeded the national average.

ACT results were similar to those of the SAT. The number of ACT test takers per 1,000 12th grade students increased over time with the exception of Cohorts 97. Cohorts 94 and 95 exceeded the national average. As expected with the increase in numbers of ACT test takers, mean scores for both mathematics and science declined. In all years mean scores were well below national averages.

The primary goal of increasing the enrollment and successful completion of college preparatory mathematics and science courses was accomplished. Other measures of achievement, especially assessment test results, also showed positive results. The disparities and achievement gaps between underrepresented minority and white students were narrowed. While the work is not yet finished, the districts represented in the CPMSA program are continuing to work toward the ultimate goal of all students reaching their full potential.

Banneker Partnership was implemented in **Omaha, NE** to address enrollment disparities and achievement gaps that existed between white students and underrepresented minority students. In the realm of curricular reform, Banneker Partnership's goals were aimed at correcting practices in areas that were having a disproportionately negative impact on African-Americans students. Corresponding reform came in the form of eliminating the informal "tracking" that was reportedly occurring. Omaha Public School teachers also linked Banneker Partnership's work to improvements in the culture behind professional development in the district by encouraging teachers to document and share "best practices". Banneker Partnership funds also had a direct impact on professional development efforts; by SY 2000-01, 44% of elementary school teachers, 93% of middle school teachers, and 96% of high school teachers participated in documented professional development directly related to CPMSA goals. Successful partnerships formed during the CPMSA time period included the following partners: the University of Nebraska of Omaha (UNO), Girls Inc, and the Zion Baptist Church. Banneker Partnership's work to engage parents in their students' mathematics and science coursework was also very successful and was highlighted by the high parental response rate in Banneker Partnership's School/Parent Agreement.

The CPMSA project in **Jackson, MS** has had a considerable and extensive impact on JPS' reform efforts in mathematics and science. Numerous reform areas were affected including curriculum, instruction, assessment, professional development, partnerships, and policy formation. Central to the JPS reform effort was ensuring a standards-based curriculum for mathematics and science courses was implemented. By SY 2000-01 JPS had aligned with standards set by the National Council of Teachers of Mathematics (NCTM) and the National Science Teachers Association (NSTA) resulting in 100% of JPS schools adopting standards-based mathematics and science curriculum. Professional development practices were reformed with a particular focus on mathematics and science teachers. Over 97% of all K-12 teachers participated in professional development activities. Numerous partnerships were formed between JPS and the surrounding community. The most prominent was with Jackson State University (JSU), which gave rise to the Center of Excellence for

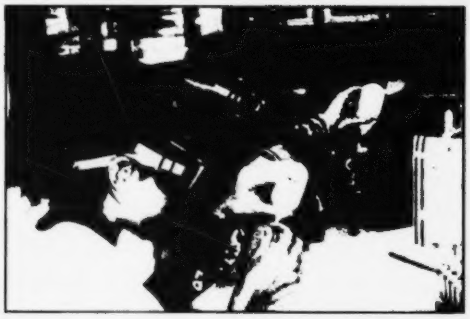
Research, Teaching, and Learning (CERTL).

Project TEAMS has had a substantial effect on **Laredo, TX** science and mathematics reform efforts. Project TEAMS' impact reached across all reform areas including curriculum, instruction, assessment, policy formation, the development of partnerships, and professional development practices. Laredo Independent School District's administrators and teachers were unified in crediting the CPMSA initiative as being a driving force in "raising standards" across all of these reform areas. All policy decisions are now based heavily on data. By SY 2000-01, the development of partnerships with community members/organizations, business/industry, and institutions of higher education has had an impact on over 10,000 students. Professional development practices were also reformed to create more rigorous standards for teachers. Beginning in SY 1999-2000, mathematics and science K-12 teachers were required to participate in 60 hours of professional development in standards-based content annually.

The CPMSA project in **Oakland, CA** made several significant steps toward bettering mathematics and science achievement of its students while still leaving room for improvement in other areas. Project reform areas included professional development, partnerships, curriculum, instruction and assessment. One of the most significant changes in Oakland Unified School District was the reduction in the number of teachers working with emergency credentials from over 700 in the spring of 2000 to 29 by September of 2002. This was the result of partnerships with higher education institutions to provide professional development. Other areas of professional development were impacted as well. During SY 2000-01, 1,281 Oakland teachers participated in professional development activities, an increase of 691 teachers from the previous year. Many partnerships were formed between Oakland and neighboring organizations including the University of California-Berkeley, Mills College, Lawrence Hall of Science and the Chabot Space and Science Centers. Numerous partners combined to form broader based Consortiums that met with CPMSA staff. Out of these partnerships sprang district strategies to better reach the goals of high achievement for all students.

Mathematics and science reform efforts, including CPMSA, in **Montgomery, AL** were designed to accomplish several fundamental objectives, including: raising student expectations, improving teacher performance, and providing students with support in mathematics and science. Curricular reform had two primary objectives: to establish and support a standards-based mathematics and science curriculum, and to "raise standards" for students' performance. During CPMSA implementation, mathematics and science curricula were fully aligned with state and national standards and teachers received training in standards-based instruction. During the grant period, Montgomery Public Schools eliminated several "watered-down" courses and replaced them with more rigorous courses. The Montgomery Public Schools also established several enrichment and support programs to enhance mathematics and science. Improving professional development offerings was also a fundamental objective of Montgomery's vision of reform. Professional development reform was geared toward improving teaching strategies. Partnerships with higher education institutions, local businesses and industry, and community-based organizations were a vital component of the Montgomery CPMSA. A number of college and university partners provided integral support in the area of professional development.

The five sites highlighted in this report are representative of the hard work and accomplishments of all of the CPMSA sites. Each site was unique in its goals and implementation strategies, however, they all shared a common goal of providing a high quality education to our children.

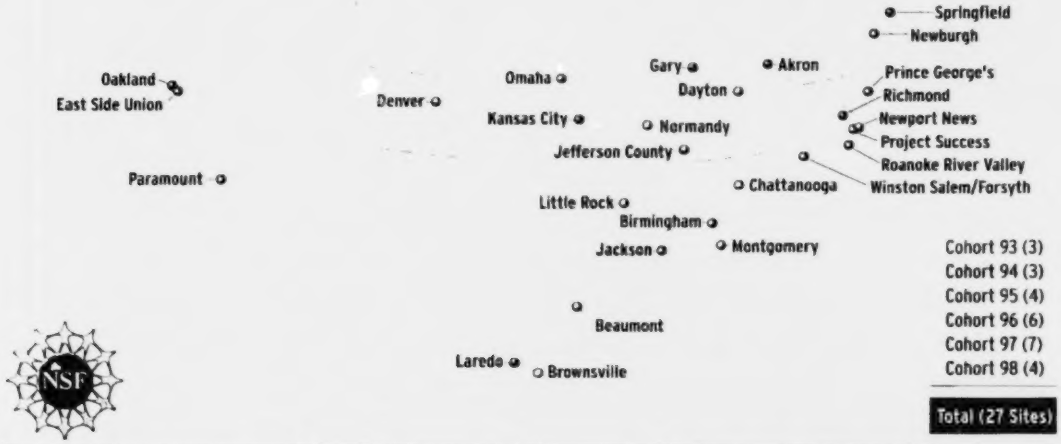


Section I

CPMSA ACHIEVEMENT HIGHLIGHTS

The Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) is a National Science Foundation (NSF) program, launched in 1993, designed to improve the mathematics and science education of urban students in medium sized cities. Twenty-seven cities, as shown in Figure 1.1, received competitively awarded five-year cooperative agreements from NSF to improve their educational infrastructure and student achievement by focusing on partnerships with colleges, universities and community organizations to design and implement both student and teacher enrichment activities. The program was initially entitled The Comprehensive Partnerships for Minority Student Achievement (CPMSA). As the program matured, a more systemic approach was embraced, and the focus shifted to standards-based curriculum, instruction, assessment, and professional development of teachers and administrators, in addition to partnerships with higher education institutions. The program name was revised in 1996 as a reflection of the changed emphasis to the mathematics and science education of ALL students.

Figure 1.1
CPMSA Sites


Springfield
Newburgh
Oakland
East Side Union
Omaha
Gary
Akron
Prince George's
Richmond
Dayton
Denver
Kansas City
Normandy
Newport News
Project Success
Jefferson County
Roanoke River Valley
Paramount
Chattanooga
Winston Salem/Forsyth
Little Rock
Birmingham
Jackson
Montgomery
Beaumont
Laredo
Brownsville
NSF
Cohort 93 (3)
Cohort 94 (3)
Cohort 95 (4)
Cohort 96 (6)
Cohort 97 (7)
Cohort 98 (4)
Total (27 Sites)

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All of the CPMSA cities had high rates of poverty and large populations of underrepresented minority children enrolled in the public schools. By school year (SY) 2000-01, the program had impacted almost one million students, and over 29,000 teachers in more than 1,300 schools. The CPMSA Cooperative Agreements were awarded in six different years (annually from 1993 to 1998); each year represented a cohort. This report highlights the achievements of the program overall and presents case stories of five selected CPMSA sites: Omaha, NE (Cohort 95), Jackson, MI (Cohort 96), Laredo, TX (Cohort 97), Oakland, CA (Cohort 97), and Montgomery, AL (Cohort 98).

By the early 1990's it was clear that urban students were not achieving in mathematics and science to the level necessary for success in an increasingly technological world. Their schools were not providing challenging standards-based curricula and instruction. Teachers did not have adequate preparation for teaching mathematics and science and were not receiving enough professional development in content and pedagogy to address the problem. In addition, policies needed to be strengthened and implemented to ensure that all students were receiving a rigorous education based on the belief that all children can learn if exposed to a high quality curriculum taught by well qualified teachers.

The primary goal of CPMSA was to "increase the number of students enrolling in and successfully completing precollege courses which will prepare them to pursue undergraduate programs in the science, engineering and mathematics." (Ref. 1) Program strategies to address these goals and objectives are outlined below:

- Develop and/or revise courses and enrichment activities at the elementary and secondary school level, accompanied by an increase in enrollments, to improve the quality of mathematics and science education.
- Develop and strengthen teacher capacity to deliver standards-based curriculum and instruction with the result of an increase in the numbers of students academically prepared to enter college with science, technology, engineering and mathematics (STEM) majors.
- Develop and implement policies to increase the numbers of students enrolling in, and successfully completing, gate-keeping and higher-level mathematics and science courses.
- Decrease or eliminate the practice of academic tracking, improve academic counseling, and facilitate students' successful transitions from elementary school to middle school, middle school to high school, and high school to undergraduate programs in STEM.
- Encourage partnerships among secondary schools, higher education institutions and informal science organizations (i.e. museums, aquariums) to develop summer enrichment activities.
- Develop student mentoring programs with professional organizations, and businesses and industry; coordinate partnerships formed within other NSF supported programs, other Federal agencies, and private sector organizations to converge resources and avoid the duplication of services.
- Converge resources and avoid the duplication of services among NSF supported programs, other Federal agencies and private sector programs.
- Develop outreach programs for parents.
- Collaborate with other NSF funded educational activities including Statewide Systemic Initiatives (SSIs) and Louis Stokes Alliances for Minority Participation (LSAMPs).

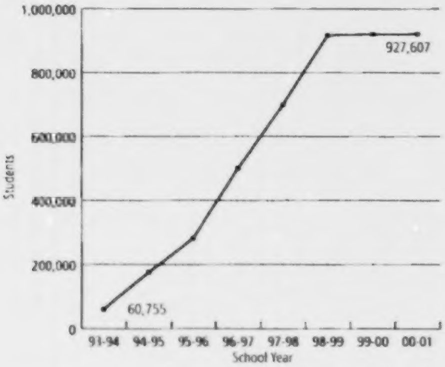
Several elements were observed as key to reform efforts at every site: the adoption of standards-based curriculum, instruction focusing on "hands-on" inquiry-based learning, and assessment; professional development; building partnerships with local organizations including colleges and universities, businesses and industries, and local informal science institutions; and strong and consistent leadership to develop policies to support high quality mathematics and science education for all students.

The most important key indicators for successful CPMSA implementation are student achievement and outcome data including increased enrollment and successful completion of gate-keeping and higher-level science and mathematics courses, improved scores on standardized tests of science and mathematics achievement, and increased test taking rates and higher scores on college entrance examinations. Underlying increased achievement by all students is the narrowing of participation disparities and achievement gaps between underrepresented minority and white students.

As shown in Figure 1.2, the number of students enrolled in CPMSA districts has increased from 60,755 in SY 1993-94 to 927,607 as the number of sites were added. In SY 2000-01 the largest represented racial/ethnic group was Black at 50.5%, followed by white students at 25.3% and Hispanic at 19.5%. Males slightly outnumbered females by 51% to 49%. Elementary school (K-G5) students comprised more than half (51.3%) of the total CPMSA districts' populations.

Figure 1.2

Number of Students Enrolled in CPMSA Districts: SY 1993-94 to SY 2000-01*1



CPMSA Districts Facts in Brief (SY 2000-01)

Students: Total 927,607

by Race/Ethnicity:*2
Black: 50.5%
White: 25.3%
Hispanic: 19.5%
Asian/Pacific Islander: 3.5%
American Indian: 0.4%
Other: 0.9%

by Gender:*2
Male: 49% Female:51%

by Grade Level:*3
Grades K-5: 51.3%
Grades 6-8: 20.4%
Grades 9-12: 27.8%
Ungraded: 0.4%

District Schools: Total 1,510

CPMSA Schools: Total 1,390
Elementary Schools: 916
Middle Schools: 249
High Schools: 208
Ungraded: 17

Mathematics and Science Teachers: Total 29,053
Elementary School: 22,506
Mathematics G6-12: 3,348
Science G6-12: 3,199

Professional Development Participation: 79%

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*1 Data from Normandy and Newport News were imputed

*2 Data from Akron, Kansas City, Newport News, Normandy and Paramount not available.

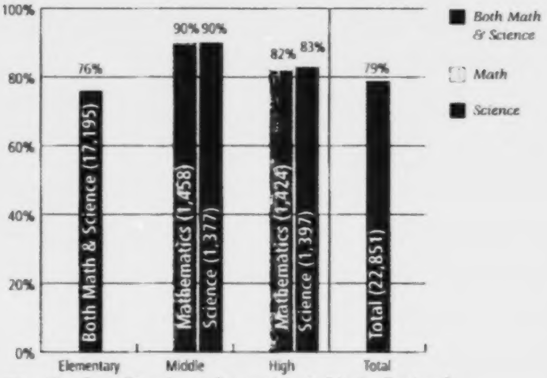
*3 Data from Denver, Jefferson and Normandy were imputed.

Sources: TISC-2002 (Ref. 5), CDE-2002 (Ref. 3)

A common and important focus across all of the CPMSA projects was professional development. As shown in Figure 1.3, in SY 2000-01 79% of teachers teaching mathematics and/or science participated in professional development. Professional development activities included content training, pedagogy, and curriculum standards.

Figure 1.3

Percentage of Teachers who Participated in Professional Development by School Level*1 SY 2000-01



( ) Number of teachers who participated in Professional Development

*1 SY 2000-01 data from Denver, Gary, Jefferson County and Normandy not available.

Source: TISC-2002 (Ref. 5), CDE-2002 (Ref. 3)

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An effective strategy to encourage high school student enrollment in gate-keeping mathematics and science courses is to strengthen graduation requirements. Table 1.1 outlines graduation requirement changes from the baseline year (year prior to CPMSA implementation) to SY 2000-01. Eleven of the 26 CPMSA sites increased mathematics requirements; 14 increased science requirements. Of note is that 11 sites have requirements that are more stringent than their respective states.

Table 1.1

High School Graduation Requirement Changes in Mathematics and Science from Baseline to SY 2000-01

		Mathematics (number of years)				Science (number of years)				Algebra I & Geometry Required	Laboratory Science Required	District Requirements Higher than State Requirements	
		1	2	3	4	1	2	3	4			Math	Science
C. 1993 (baseline 1993-94)	Brownsville			○	→○		☐			Yes	Yes	Yes	No
	Chatt./Hamilton Cnty.		○	→○			○	→○		Yes	Yes	No	No
	Normandy			☐				☐		No	No	Yes	Yes
C. 1994 (baseline 1994-95)	Denver		○	→○			○	→○		Yes	Yes	n.a.	n.a.
	Jefferson County			☐			☐			Yes	Yes	No	No
	Newport News			☐				☐		Yes	Yes	No	No
C. 1995 (baseline 1995-96)	Birmingham			○	→○		○		→○	Yes	Yes	No	No
	Omaha		☐				☐			Algebra I	Yes	n.a.	n.a.
	Winston-Salem		☐				☐			No	Yes	No	No
Cohort 1996 (baseline 1996-97)	East Side Union H.S.		☐				☐			Yes	Yes	Yes	No
	Jackson			☐			○	→○		Yes	Yes	No	No
	Newburgh Enlarged		○	→○			○	→○		No	No	No	No
	Paramount			☐			☐			Yes	Yes	Yes	Yes
	Prince George's Cnty.			☐				☐		Algebra I	Yes	Yes	Yes
	Roanoke River Valley Consortium												
	• Weldon		☐				○	→○		Algebra I	Yes	No	Yes
	• Warren			☐				☐		Algebra I	Yes	Yes	Yes
	• Bertie		○	→○			○	→○		Algebra I	Yes	Yes	Yes
	• Hertford		○	→○			○	→○		Algebra I	Yes	Yes	Yes
	• Northampton		○		→○		○		→○	Algebra I	Yes	Yes	Yes
Cohort 1997 (baseline 1997-98)	Akron			☐			☐			No	No	No	No
	Gary			☐			☐			No	No	Yes	No
	Kansas City		○	→○			○	→○		Yes	Yes	Yes	Yes
	Laredo		○	→○			○	→○		Yes	Yes	Yes	Yes
	Oakland		○	→○			○	→○		Yes	Yes	Yes	Yes
	Richmond		○	→○			○	→○		No	No	No	No
	Springfield			☐				☐		No	No	n.a.	n.a.
C. 1998 (baseline 1998-99)	Beaumont			☐				☐		Yes	Yes	No	Yes
	Dayton			☐			☐			No	No	No	No
	Little Rock		○	→○			○	→○		Yes	Yes	No	No
	Montgomery				☐				☐	Yes	Yes	No	No

→ Indicates change in the number of years required for graduation from baseline to SY 2000-01

☐ Indicates no change in the number of years required for graduation from baseline to SY 2000-01

n.a. Not applicable. Graduation requirements determined locally

Source: TISC-2002 (Ref. 5) and NCES Digest 2001 (Ref. 4)

STUDENT ACHIEVEMENT HIGHLIGHTS

Selected samples of student achievement are presented here. Additional achievement data may be found in Appendix A. The data are based on Tabulated Indicators of Systemic Change - (TISC-2002) (Ref 4), a database developed and implemented by Systemic Research since 1994.

- Mathematics Gate-keeping and Higher-level Course Completion and Enrollment
- Science Gate-keeping and Higher-level Course Completion and Enrollment
- Algebra I in 8th grade Completion and Enrollment
- Mathematics and Science Assessment Test Results
- Advanced Placement Test
- Scholastic Achievement Test (SAT) Results
- American College Test (ACT) Results

Figure 1.4 illustrates improvements in high school mathematics gate-keeping and higher-level course enrollment between the first year of the project to SY 2000-01. The Cohort 93 site increased its enrollment from 5,035 in SY 1993-94 (47% of the total grade 9-12 student population) to 8,930 (88%) in SY 2000-01. Similar gains were made in successful course completion (grade C or higher). The number of students successfully completing mathematics courses increased from 3,889 (36%) to 6,319 (63%). All of the cohorts experienced gains, albeit smaller than gains seen in Cohort I.

Analogous results were observed in science as shown in Figure 1.5. For example, enrollment of students in gate-keeping and higher-level science courses in the Cohort 93 site increased from 2,284 (21% of total grade 9-12 student population) to 5,799 (57%). Course completion rates paralleled the enrollment rates, increasing from 2,133 students (20%) to 4,470 (44%) in SY 2000-01.

About The Study

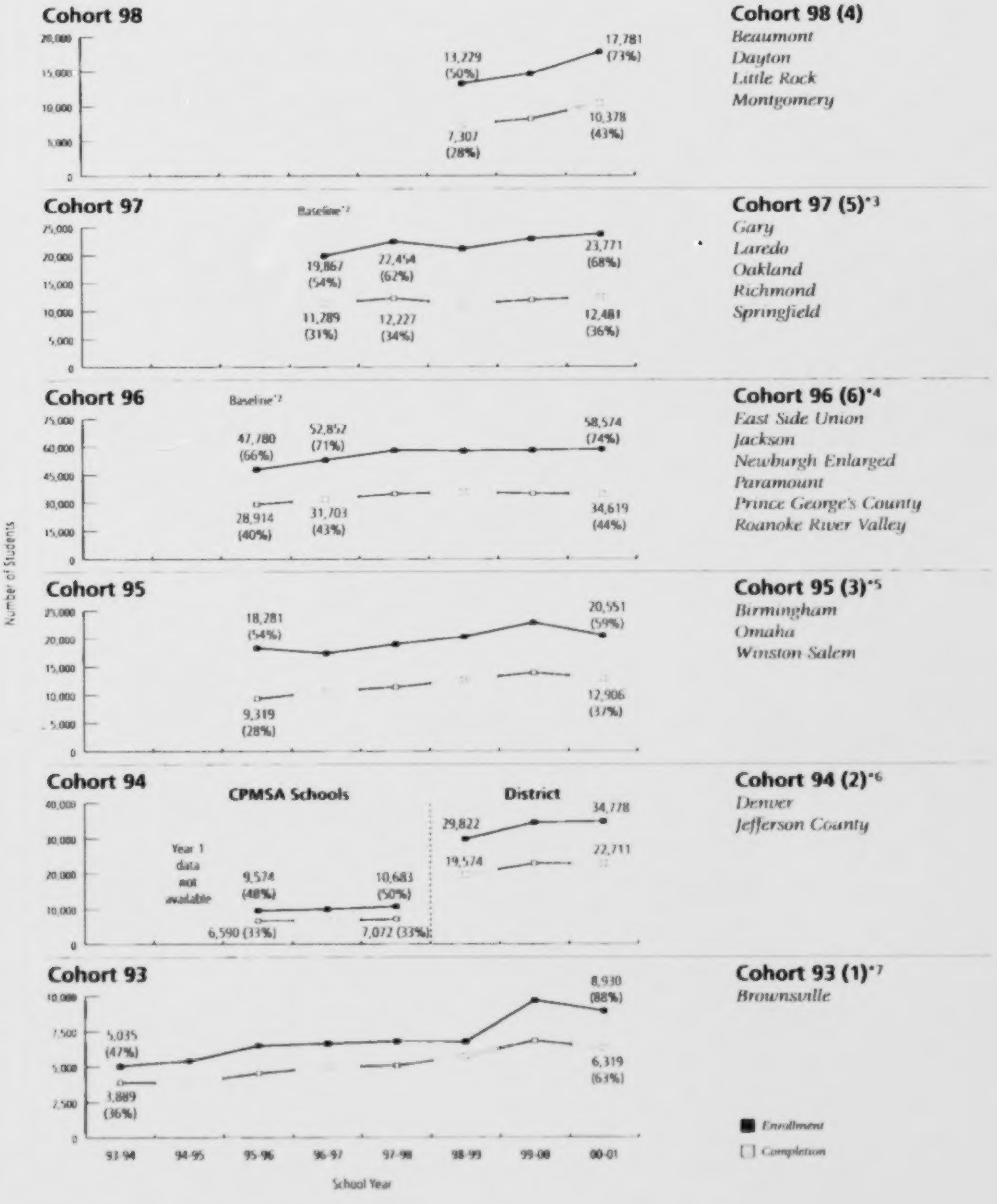
This publication concludes Systemic Research's three year project, **Evaluative Study of the Comprehensive Partnerships for Mathematics and Science Achievement Based on the Tabulated Indicators for Systemic Changes**, funded by the National Science Foundation (REC-0080724). The companion report, *Raising Standards and Achievement in Urban Schools: Case Stories from CPMSAs in Hamilton County/Chattanooga and Newport News Public Schools* was published in January 2002. This report highlights the achievements of the first two cohorts of CPMSA sites, and two selected sites within these cohorts.

The complete data set from the 27 CPMSA sites is available in *CPMSA Fact Book 2002*, May 2003. The three volume Fact Book presents annual progress data from SY 1992-93 to 2000-01 based on the Tabulated Indicators for Systemic Changes (TISC) database developed by Systemic Research, Inc. The Fact Book contains both quantitative and qualitative indicators for each CPMSA site. The Fact Book is available on CD-ROM and the web site *www.systemic.com/cpmsa*.

Raising Standards and Achievement in Urban Schools
CPMSA
Fact Book 2002

Figure 1.4

Enrollment and Completion in G9-12 Mathematics Gate-Keeping and Higher-Level Courses from Year 1 to SY 2000-01[1]



(%) Percentage of total G9-12 student population who enrolled in and successfully completed (grade 'C' or above) gate-keeping or higher-level courses

[1] Mathematics gate-keeping and higher-level courses include Algebra I & II, Geometry, Trig/Pre-Calculus and Calculus.

[2] Baseline Year: Year prior to CPMSA implementation.

[3] Akron and Kansas City are not included because less than three years of enrollment and completion data are available. Data were imputed for Springfield SY 1996-97 student population.

[4] Data were imputed for Paramount SY 2000-01 student population.

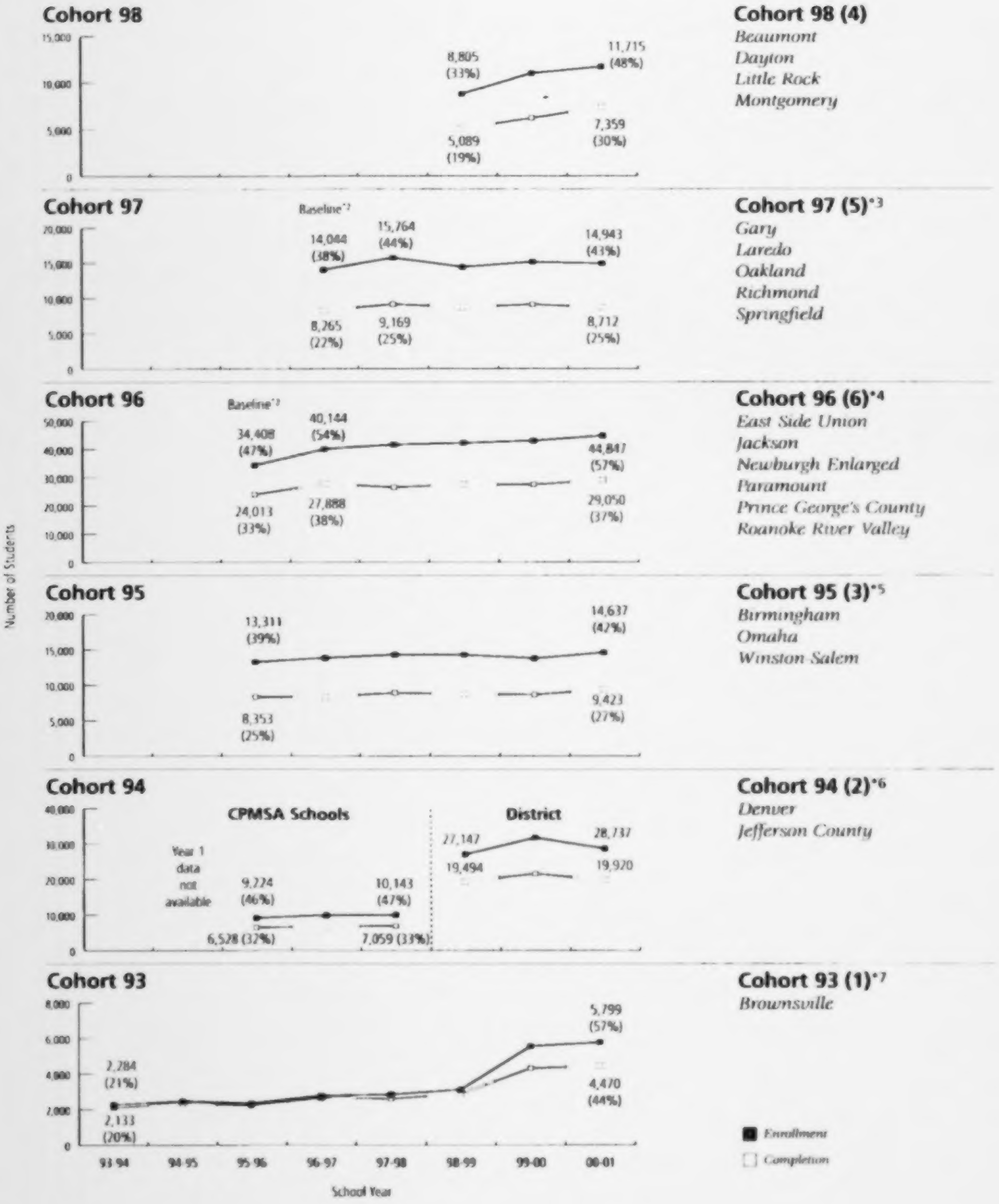
[5] Data were imputed for Omaha SY 2000-01 enrollment and completion totals.

[6] Data for CPMSA Schools only collected prior to SY 1998-99; District-wide data collected beginning in SY 1998-99. Newport News is not included because not enough enrollment and completion data are available.

[7] Chattanooga/Hamilton County and Normandy are not included because not enough enrollment and completion data are available.

Figure 1.5

Enrollment and Completion in G9-12 Science Gate-Keeping and Higher-Level Courses from Year 1 to SY 2000-01[*1]



(%) Percentage of total G9-12 student population who enrolled in and successfully completed (grade 'C' or above) gate-keeping or higher level courses.

[*1] Science gate-keeping and higher-level courses include Biology I, Chemistry I, and Physics I.

[*2] Baseline Year: Year prior to CPMSA implementation.

[*3] Akron and Kansas City are not included because less than three years of enrollment and completion data are available. Data were imputed for Springfield SY 1996-97 student population and Richmond SY 1996-97 enrollment and completion totals.

[*4] Data were imputed for Paramount SY 2000-01 student population.

[*5] Data were imputed for Omaha SY 2000-01 enrollment and completion totals.

[*6] Data for CPMSA Schools only collected prior to SY 1998-99, District-wide data collected beginning in SY 1998-99. Newport News is not included because not enough enrollment and completion data are available.

[*7] Chattanooga/Hamilton County and Normandy are not included because not enough enrollment and completion data are available.

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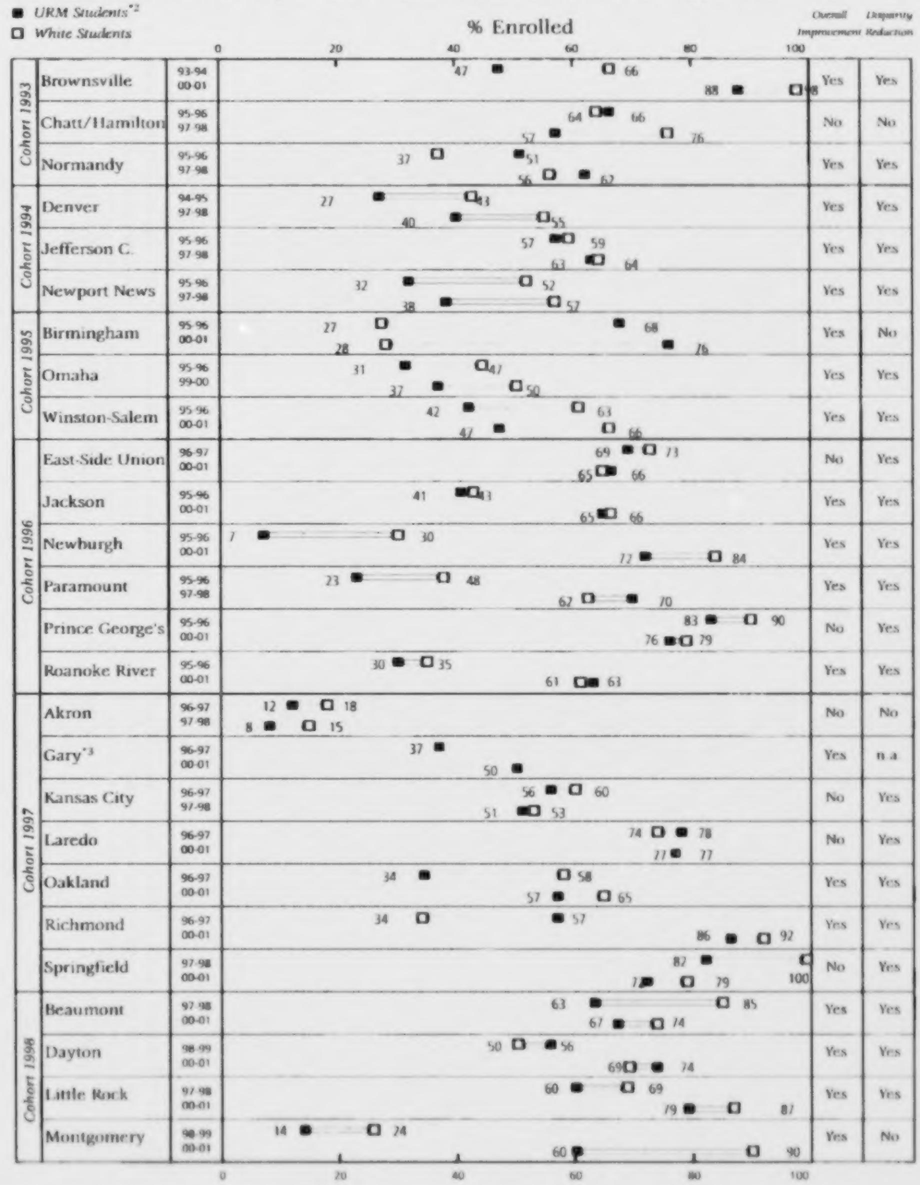
A major concern of all urban school districts is the participation disparity and achievement gaps between white and underrepresented minority students. As an example of the progress made in this area, Figure 1.6 portrays the G 9-12 gate-keeping and higher level mathematics course enrollment changes and disparities among underrepresented minority and white students between comparison years (based on available data). The data are presented as percentages of the total G 9-12 student population. Nineteen of the 26 CPMSA sites increased their mathematics' courses enrollments while 21 sites successfully reduced their enrollment disparities.

Figure 1.6

G9-12 Gate-Keeping and Higher-Level Mathematics Course Enrollment Percentage and Disparity Among Underrepresented Minority and White Students Between Comparison Years*1



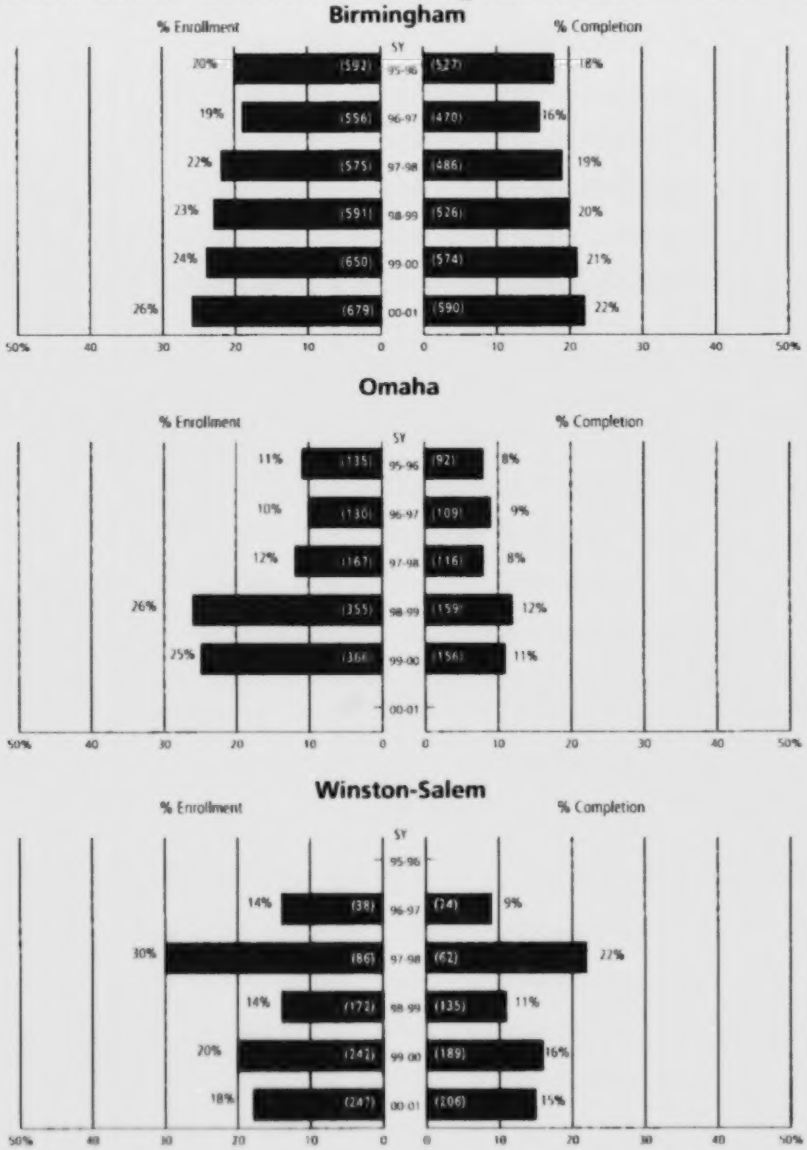
Mathematics Gate-Keeping courses includes Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus, and Calculus
n.a.: not applicable

*1 Includes first and most recent years available
*2 URM includes American Indian, Black, and Hispanic students
*3 Comparison not presented if Whites < 2% of the total population

Algebra I in 8th grade underrepresented minority student enrollment and completion between the baseline year and SY 2000-01 experienced mixed results. Cohort 96 data is shown in Figure 1.7. Of the four CPMSA districts in the cohort, three sites increased both their enrollment and completion rates. Prince George's County's results were disappointing; enrollment decreased from 30% of the total 8th graders to 12%, with a corresponding decrease in completion from 23% to 10%.

Figure 1.7

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1995-96 to SY 2000-01: Cohort 95 Sites (Birmingham, Omaha, and Winston-Salem)



Example In SY 1995-96, 20% (592 of 2,903) of the underrepresented minority 8th grade students enrolled in Algebra I and 18% of students (527 of the 2,903) successfully completed with a grade 'C' or above

% Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

(#) Number of URM 8th grade students enrolled or successfully completing (grade 'C' or above) Algebra I

Note: Baseline data not available for any site in Cohort 95. Data not available for Omaha in SY 2000-01 and Winston Salem in SY 1995-96.

Source TISC-2002 (Ref. 5)

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All of the CPMSA districts resided in states that required mathematics and science assessment tests. Table 1.2 outlines the assessment tests and their respective performance benchmarks, including which benchmarks are considered passing.

Fourth grade assessment test results are presented here as representative examples of student achievement progress made throughout the CPMSA grant period. Figure 1.8 compares the passing rates of white and underrepresented minority students on mathe-

Table 1.2

Mathematics and Science Tests and Performance Benchmarks

	Sites	Assessment Tests	Performance Benchmarks (🟩 green shaded areas indicate passing)								
C. 93	Brownsville, TX	TAAS	Did not meet minimum expectations	Met minimum expectations							
	Chatt./Hamilton, TN	Terra Nova	Level IV	Level III	Level II	Level I					
C. 94	Denver, CO	ITBS/ITED	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Jefferson County, KY	CATS	5th Quintile	4th Quintile	3rd Quintile	2nd Quintile	1st Quintile				
C. 95	Birmingham, AL	SAT-9	Stanine 1	Stanine 2	Stanine 3	Stanine 4	Stanine 5	Stanine 6	Stanine 7	Stanine 8	Stanine 9
	Omaha, NE	CAT-5	50th percentile or below	51st percentile or above							
	Winston-Salem/Forsyth	EOG/EOC	Level I	Level II	Level III	Level IV					
Cohort 96	East Side Union HS, CA	SAT-9	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Jackson, MS	Terra Nova/FLE	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Newburgh, NY	Terra Nova	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Paramount, CA	SAT-9	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Prince George's C., MD	MSPAP	Below Satisfactory	Satisfactory or Better							
	Roanoke River V.C., VA	EOG/EOC	Level I	Level II	Level III	Level IV					
Cohort 97	Akron, OH	OPT	Below	Fail	Proficient or better	Pass					
	Gary, IN	Terra Nova/ISTEP	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Kansas City, KS	KAM	Failing	Passing							
	Laredo, TX	TAAS	Below 70 (Math)	Below 1500 (Science)	70 or above (Math)	1500 or Above (Science)					
	Oakland, CA	SAT-9	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Richmond, VA	Stds. of Learning	Failed	Proficiency or better							
	Springfield, MA	MCAS	Failing	Needs Improvement or better							
Cohort 98	Beaumont, TX	TAAS	Failing	Passing							
	Dayton, OH	OPT	Below	Proficient or better							
	Little Rock, AK	ACTAAP (Math)	Below Basic	Basic or better							
		SAT-9 (Science)	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					
	Montgomery, AL	SAT-9	4th Quartile	3rd Quartile	2nd Quartile	1st Quartile					

Source: TISC-2002 (Ref. 5)

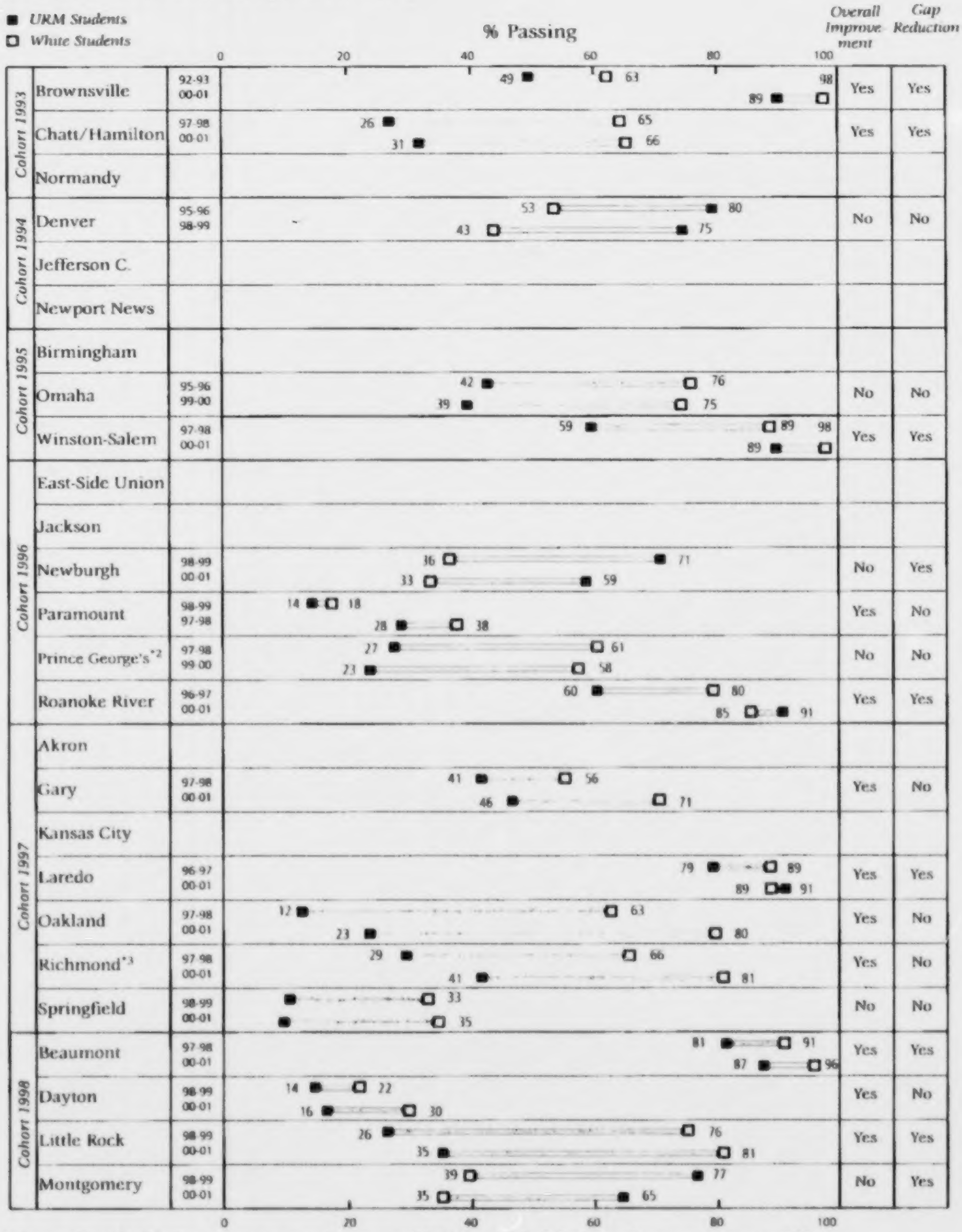
🟩 Shaded green areas represent benchmark categories used to determine passing rates

ACTAAP: Arkansas Comprehensive Testing, Assessment and Accountability Program
CAT-5: California Achievement Test Fifth Edition
CATS: Commonwealth Accountability Testing System
EOC: North Carolina's End of Course Test
EOG: North Carolina State End of Grade Test
FLE: Functional Literacy Exam
ISTEP: Indiana State Testing for Educational Progress
ITBS: Iowa Tests of Basic Skills
ITED: Iowa Tests of Educational Development
KAM: Kansas Assessment of Mathematics
MCAS: Massachusetts Comprehensive Assessment System
MSPAP: Maryland School Performance Assessment Program
OPT: Ohio Proficiency Test
SAT-9: Stanford Achievement Test, Ninth Edition
TAAS: Texas Assessment of Academic Skills

matics tests between comparison years. Twelve of the 17 sites with available data showed overall improvement in the percentage of students passing the 4th grade mathematics test, with nine sites narrowing the achievement gap.

Figure 1.8

4th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years*1



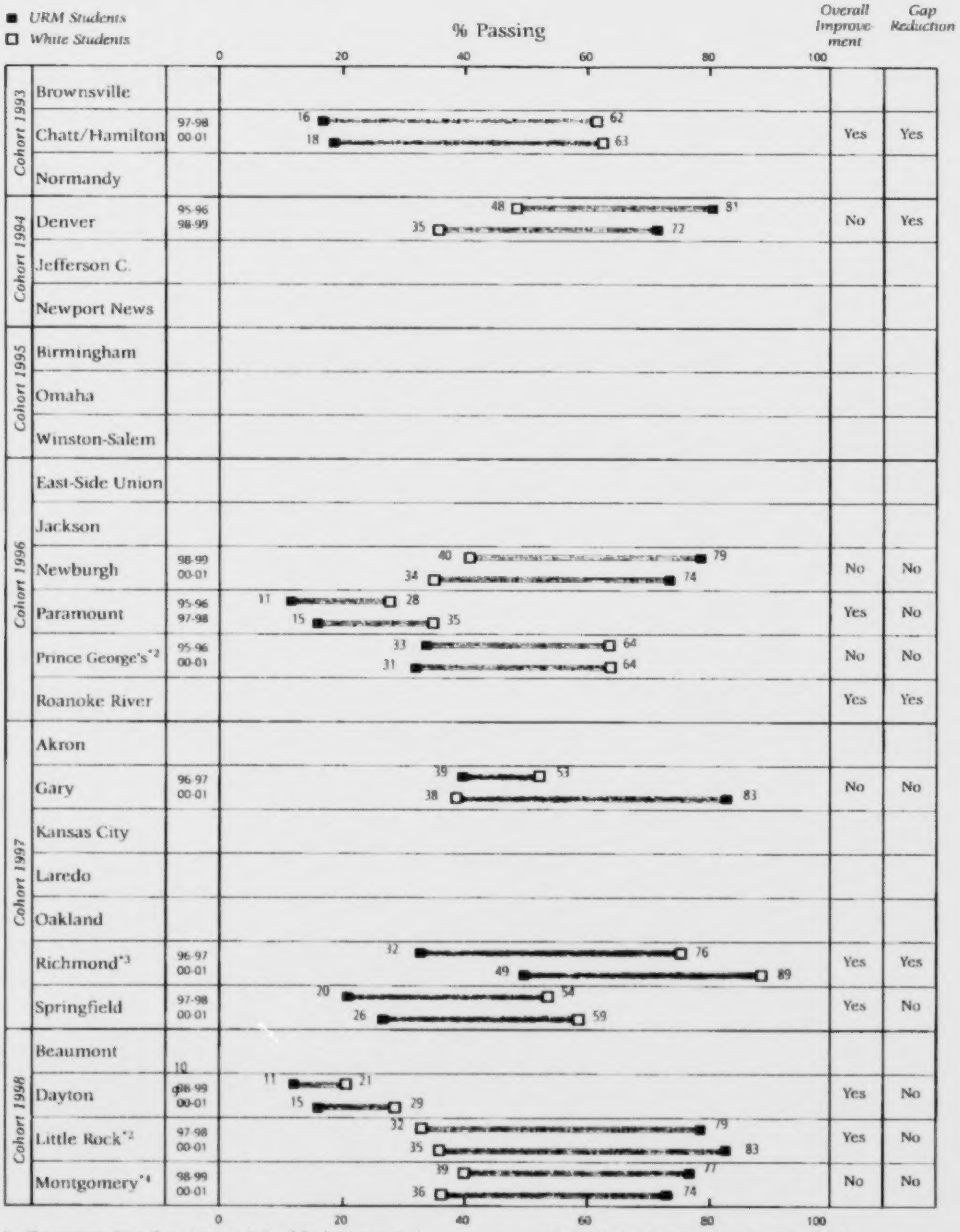
Example: In Brownsville, 49% of the largest minority group (Hispanic) and 63% of White students passed the TAAS in 1992-93. In 2000-01, 89% of Hispanic and 98% of White students passed the TAAS. Thus, the gap decreased from 14 to 9 percentage points.

*1 Includes first and most recent years available.
*2 5th Grade data shown
*3 3rd and 5th Grade combined data shown
Source: TISC 2002 (Ref. 5)

Figure 1.9 illustrates the science results. Seven sites (out of a possible 11) experienced gains in overall improvement while four sites also reduced the gap between white and underrepresented minority students.

Figure 1.9

4th Grade Science Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years[*1]



Example: In Chattanooga/Hamilton County, 16% of the largest minority group (Black) and 62% of White students passed the Terra Nova Achievement Test in 1997-98. In 2000-01, 18% of Black and 63% of White students passed the Terra Nova Achievement Test. Thus, the gap decreased from 46 to 45 percentage points.

*1 Includes first and most recent years available.
*2 5th Grade data shown
*3 3rd and 5th Grade combined data shown
*4 CPMSA schools only

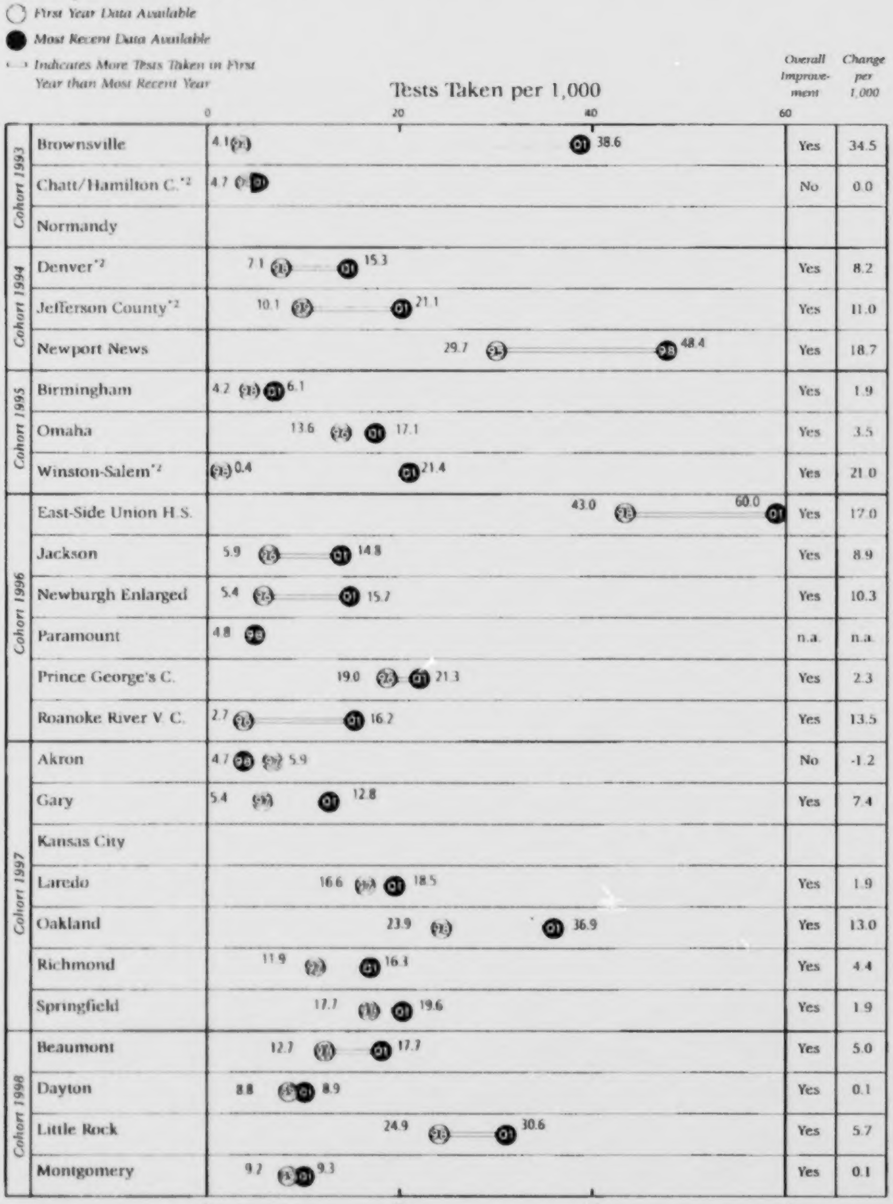
Source: TISC-2002 (Ref. 5)

Another measure of student achievement is college entrance examinations. The number of students taking the examinations is an indicator of students' intention to pursue post secondary education, whereas the test results are a measure of content knowledge. Data were obtained from the College Board.

Advanced placement test results reflect those students who are ready for college level work. Figure 1.10 shows changes in the number of Advanced Placement tests taken per 1,000 11th and 12th grade students. This may be used as an estimate of the number of students enrolled in Advanced Placement courses. All but two sites increased the number of tests taken.

Figure 1.10

Changes in Mathematics Advanced Placement Tests Taken per 1,000 11th and 12th Grade Students Between Comparison Years*1



n.a. not applicable
*1 Includes first and most recent years available.
Source: TISC 2002 (Ref. 5)

*2 CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in 1998-99. Only encompassed schools presented.

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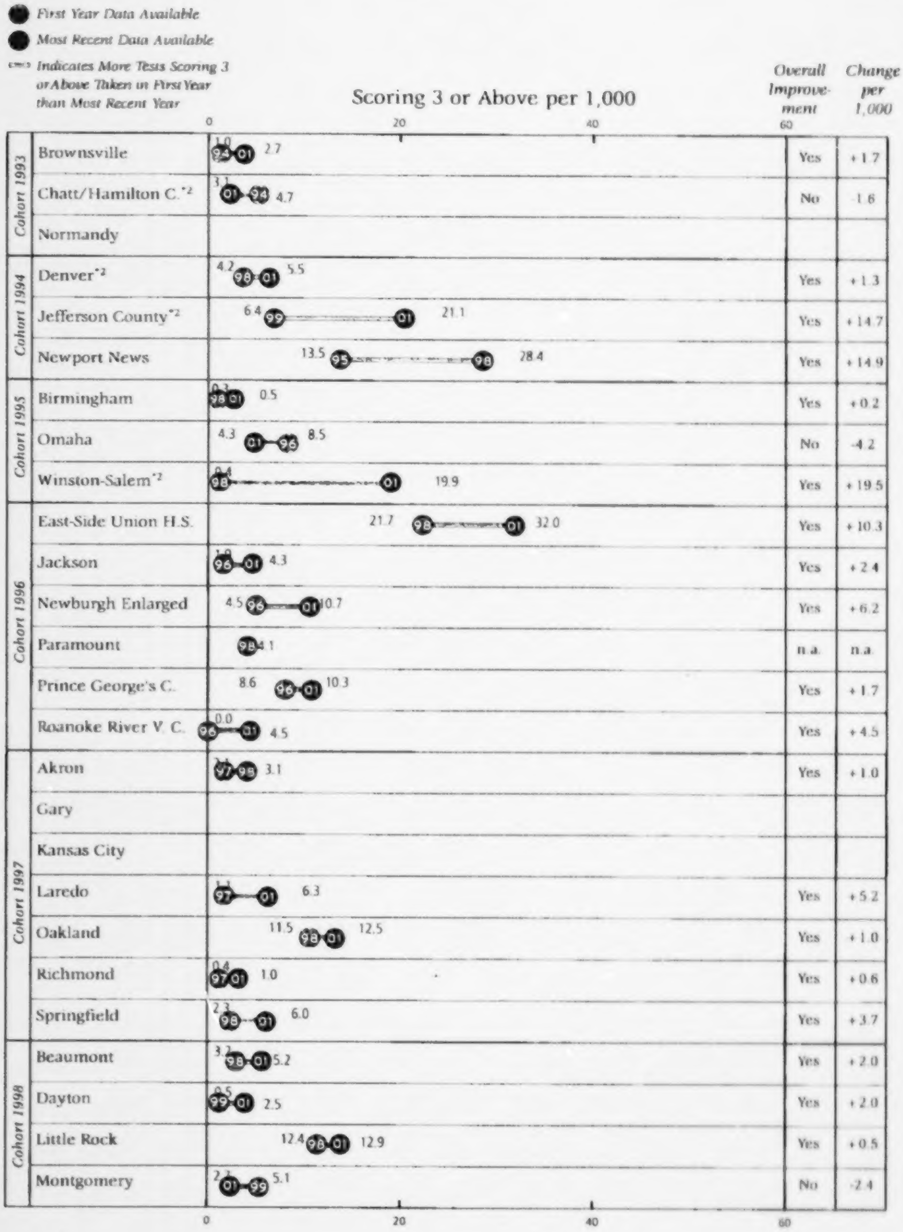
The number per thousand of 11th and 12th graders scoring 3 or above increased in the vast majority of sites (20 out of 22) as illustrated in Figure 1.11. The average increase in these 19 sites was 4.9 students per thousand. The three sites with a decrease in the number of test takers scoring 3 or above was 2.73 per thousand.

Figure 1.11

Changes in Mathematics Advanced Placement Tests Scoring 3 or Above per 1,000 11th and 12th Grade Students Between Comparison Years*1



n.a.: not applicable

*1 Includes first and most recent years available.

Source: TISC-2002 (Ref. 5)

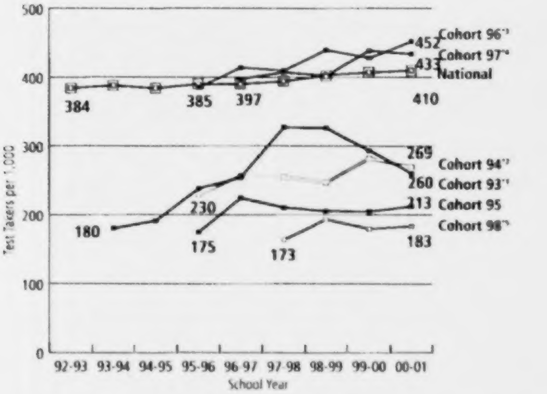
*2 CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in 1998-99. Only encompassed schools presented.

Either the Scholastic Assessment Tests (SAT) or American College Test (ACT) is an admission requirement by most colleges and universities. Different geographic areas of the county tend to favor one test over the other. Test result data were obtained directly from Educational Testing Service (SAT) and ACT, Inc. (ACT).

The number of SAT test takers per 1,000 students between SYs 1995-96 and 2000-01 is shown in Figure 1.12. All cohorts improved their test taking rates. Cohort 96 and 97 sites test taking rates exceeded the national average beginning in SY 1998-99.

Figure 1.12

Number of SAT Test Takers per 1,000 12th Grade Students (presented by Cohort)



[*1] Number of 12th grade students imputed from SY 1998-99 to 2000-01 for Normandy. Chattanooga not included because number of 12th grade students not available.

[*2] Number of 12th grade students imputed from SY 1995-96 to 1997-98 for Jefferson and from SY 1998-99 to 2000-01 for Newport News.

[*3] Number of 12th grade students imputed for SY 1999-01 for Paramount.

[*4] Number of 12th grade students imputed SY 1996-97 for Springfield. Akron and Kansas City are not included in Cohort 97 because insufficient data are available.

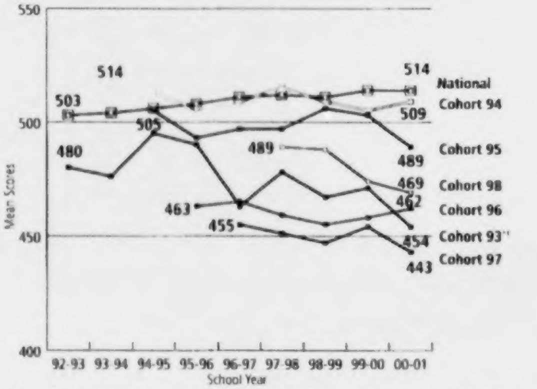
[*5] Number of 12th grade students were imputed for SY 1997-98 for Dayton and Montgomery.

Sources: TISC-2002 (Ref. 5), Projections of Education Statistics to 2011 (Ref. 1), The College Board (Ref. 6)

As the number of test takers increased, it became a challenge to sustain mean scores. Figure 1.13 exhibits the SAT mathematics mean score trends of the Cohorts. Except for Cohort 94 in SYs 1993-94, 1994-95 and 1997-98, no cohorts met or exceeded the national average.

Figure 1.13

SAT Mathematics: Non-weighted Mean Scores (presented by Cohort)[*1]



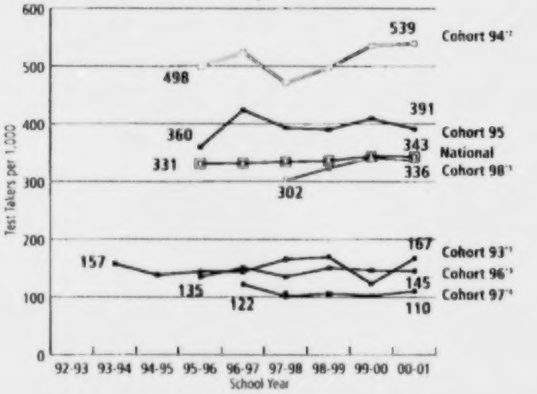
[*1] Cohort 1993 mean scores include Normandy imputed for SY 1997-98 and SY 1999-00 because there were less than five test-takers for those years.

Source: TISC-2002 (Ref. 5)

ACT results were similar to that of SAT. As shown in Figure 1.14, the number of ACT test takers per 1,000 12th grade students increased over time with the exception of Cohort 97. Cohort 94 and 95 exceeded the national average.

Figure 1.14

Number of ACT Test Takers per 1,000 12th Grade Students (presented by Cohort)



[*1] Number of 12th grade students imputed from SY 1998-99 to 2000-01 for Normandy. Chattanooga not included because number of 12th grade students not available for ACT data received prior to 1997-98.

[*2] Number of 12th grade students imputed from SY 1995-96 to 1997-98 for Jefferson and from SY 1998-99 to 2000-01 for Newport News.

[*3] Paramount not included in Cohort 96 because insufficient data are available.

[*4] Number of 12th grade students imputed for SY 1996-97 for Springfield. Akron and Kansas City are not included in Cohort 97 because insufficient data are available.

[*5] Number of 12th grade students imputed for SY 1997-98 for Dayton and Montgomery.

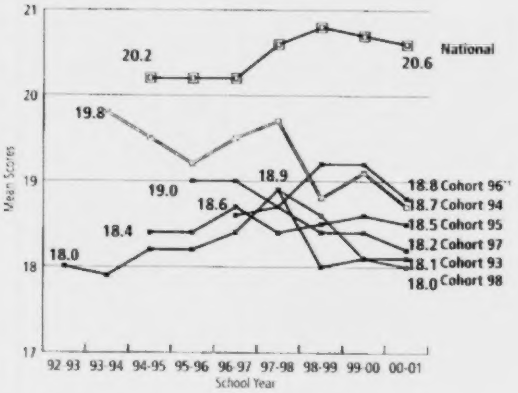
Sources: TISC-2002 (Ref. 5), Projections of Education Statistics to 2011 (Ref. 1)

As expected with the increase in numbers of ACT test takers, mean scores for both mathematics and science declined. In all years mean scores were well below national averages (see Figure 1.15).

Figure 1.15

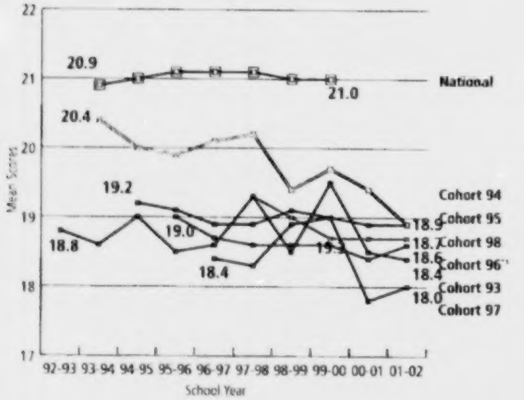
ACT Mean Scores (presented by Cohort)[1]

Mathematics



[1] Cohort 96 mean scores include Paramount imputed for SY 1995-96, and Roanoke River Valley Consortium for SY 2000-01 because there were less than five test-takers those years.

Science



[1] Cohort 96 mean scores include Paramount imputed data for SY 1995-96 and SY 2001-02, and Roanoke River Valley Consortium for SY 2000-01 because there are less than five test takers those years.

Source: TISC-2002 (Ref. 5)

The CPMSA program was a successful venture in urban school reform. Despite the myriad of challenges these school districts faced, improvements in the educational infrastructure resulted in student achievement gains. The primary goal of increasing the enrollment and successful completion of college preparatory mathematics and science courses was accomplished. Other measures of achievement, especially assessment test results, also showed positive results. The disparities and achievement gaps between underrepresented minority and white students were narrowed. The results of college entrance exams was mixed. The number of test takers of AP, SAT and ACT increased, but the mean scores of both SAT and ACT test takers declined. While the work is not yet finished, the districts represented in the CPMSA program are continuing to work toward the ultimate goal of all students reaching their full potential.

Section II

BANNEKER PARTNERSHIP: ACHIEVING EXCELLENCE IN MATHEMATICS AND SCIENCE – OMAHA PUBLIC SCHOOLS CPMSA

THE SCHOOL DISTRICT OF OMAHA is the largest school district in the state of Nebraska with over 40,000 students. The school system is ethnically diverse compared to other regions of Nebraska. Over 80% of the state's African-American student population is in the Omaha Public Schools (OPS), comprising 31.9% of enrollment. White students make up 52.1% of the student population, Hispanics 12.8%, and all other ethnic groups (primarily Asian and American Indian) combined represent the remaining 4% of the student population (Ref. 9).

Overall OPS student achievement has been above national norms. In SY 2000-01, OPS students (2nd, 4th, 5th, 6th, and 8th grades) scored above the national norms in reading, language, and mathematics on the California Achievement Tests (CAT) (Ref. 8). Despite the overall success of the OPS, disaggregated data by race/ethnicity indicated that significant differences existed among the varying ethnic groups. Similar to the patterns seen with economic differences in the city of Omaha, considerable achievement gaps and enrollment disparities existed between White and African-American students.

Results from standardized tests illustrated the achievement gap. In SY 1996-97, passing rates for mathematics assessment tests revealed a gap of over 30 percentage points between 8th grade African-American (37% percent passed) and White students (70% percent passed) (Ref. 9).

Differences were also pronounced in mathematics and

Omaha Public Schools Facts In Briefs (SY 2000-01)

Total Students: 43,997[*1]
American Indian 1.5%
Asian/Pacific Islander 1.7%
Black (Not Hispanic) 31.9%
Hispanic 12.8%
White (Not Hispanic) 52.1%
Male: 51% Female: 49%

Students Enrolled in:
Elementary Schools: 48%
Middle Schools: 23%
High Schools: 28%
Ungraded Schools: 1%

Schools: Total 79[*2]
Elementary Schools: 58
Middle Schools: 9
High Schools: 7
Ungraded Schools: 5

Mathematics and Science Teachers: Total 2,257
Elementary Teachers: 1,983
Middle School Mathematics Teachers 48
High School Mathematics Teachers: 81
Middle School Science Teachers: 54
High School Science Teachers: 91

Selected Key Indicators
Free and Reduced Lunch Students[*3]: 50%
Limited English Proficient Students[*4]: 3.33%
Individualized Education Program Students[*4]: 14.08%

[*1] Schools directly involved in CPMSA activities have a higher proportion of African-American Students than the rest of district.

[*2] 33 schools participated in Banneker Partnership. 19 schools have participated for at least four years.

[*3] Data are from SY 1997-1998.

[*4] Data were only available for Omaha, NE-IA a metropolitan statistical area that includes parts of Nebraska and Iowa

Sources:
- *Tabulated Indicators for Systemic Change* (TISC-2002), Systemic Research, Inc.
- *NSF Extract, 2000*, Omaha Public Schools, and University of Nebraska-Omaha,
- Core Data Elements, 2000, Westat, Inc.
- Common Core of Data (CCD), National Center for Education Statistics
- CPMSA- Banneker Partnership: Achieving Excellence In Mathematics and Science. 1998 Annual Narrative Report.

A Profile of Omaha, Nebraska

Omaha is located in eastern Nebraska along the Nebraska-Iowa border. It is Nebraska's largest city with a population of over 390,000. Omaha maintains a diverse population relative to the rest of Nebraska. The City of Omaha has the largest minority community within the state of Nebraska.

Approximately 78.4% of the population is White. Blacks are the second most populous ethnic group at approximately 13.3% of the population. Hispanics are the third largest ethnic group at approximately 6.1%. All other ethnic groups combined constituted less than 7% of the population (Ref. 11). Omaha's relatively low cost of living and low unemployment rate has attracted a diverse range of immigrants from around the world. For example, Omaha has a well-established Mexican population, with a population of over 22,000 (Ref. 3).

Household income varies by race and ethnic origin. In 2001, White households had the highest median income ($47,283); Black households had the lowest ($27,220) (Ref. 13). Differences also existed among groups in unemployment rates. The unemployment rate was higher for Black (7.2 %) and Hispanic (6.0 %) persons than for White, non-Hispanic persons (2.9 %).

Although the region is known primarily for the raising of livestock and grain farming, Omaha sustains a cosmopolitan culture. The city is home to 11 colleges and universities and two major medical schools (University of Nebraska Medical Center and Creighton University). The city also supports a wide variety of industries, as several major telecommunications and manufacturing companies are located within the city.

Omaha, NE

sciences courses. In SY 1995-96, only 9% of 9th grade underrepresented minority students successfully completed Algebra I (data not available for White students) (Ref. 6). Only about 4% of underrepresented minority high school graduates successfully completed physics, biology, and chemistry, compared to over 26% of White students (Ref. 9).

The enrollment disparities and achievement gaps that existed between White students and underrepresented minority students were of great concern to administrators, teachers, and community members. OPS requested NSF support, through the CPMSA program, to substantially increase the enrollment, achievement, and preparation for postsecondary studies in mathematics and science of African-American students in Omaha. In 1995, OPS began it's $3,400,000 five year CPMSA grant, entitled *Banneker Partnership: Achieving Excellence In Mathematics and Science*.

Banneker Partnership was completed in 2000. During the 1995-2000 project period, it received several awards for the work that was accomplished including the "Exemplary Mathematics Science and Engineering Program" award received from the Quality Engineering for Minority (QEM) Network.

Benjamin Banneker- The "Sable Astronomer"

Courtesy Library of Congress

Benjamin Banneker was born in Maryland in 1731. His career began as a farmer of modest means but ultimately his life evolved into one that was marked with significant achievement as a scientist, astronomer, and mathematician.

In 1791, President Jefferson selected Banneker to assist in developing plans for laying out the streets of Washington, DC. In his late fifties, Banneker began the study of astronomy. His work as an astronomer led him to publish an annual "Farmer's Almanac" from 1792-1797. The almanac was a top seller in the Mid-Atlantic.

The "Sable Astronomer", as he was known, was often cited as evidence that African Americans were intellectual equals to European Americans. In fact, President Jefferson noted this in a letter to Banneker himself. Banneker died in 1806 at the age of 74.

(Ref. 1)

BANNEKER PARTNERSHIP GOALS

At the onset of the OPS CPMSA grant, *Banneker Partnership*, seven goals were established for student achievement as briefly outlined in Table 2.1. The principal goal was to address the achievement gaps and enrollment disparities that existed between White students and underrepresented minority students, especially African-Americans.

Table 2.1

Original Banneker Partnership Goals for Student Achievement

1. The percentage of 8th Grade underrepresented minority (URM) students who successfully complete Algebra I shall increase from 7% to 20% of the total 8th grade URM population.
2. The percentage of 9th Grade URM students who successfully complete Algebra I shall increase from 9% to 35% of the total 9th grade URM population.
3. The percentage of 10th Grade URM students who successfully complete Geometry shall increase from 12% to 50% of the total 10th grade URM population.
4. The percentage of URM high school graduates who successfully complete Trigonometry/Pre Calculus or Calculus shall increase from 10% to 30% of the total URM high school graduates.
5. The percentage of URM high school graduates in the CPMSA participating schools who successfully complete Physics, Biology, and Chemistry shall increase from 4% to 30% of the total URM high school graduates.
6. Increase the percentage of URM students in CPMSA participating schools in grades 2, 4, and 6 who achieve the 50th percentile or higher on the composite mathematics score of the California Achievement Test.
7. Increase the percentage of URM students in CPMSA participating schools in grades 2, 6, 7, and 8 who achieve 80% or higher on the science outcomes of the District Benchmark Assessment program.

In addition to the specific goals outlined for student achievement, NSF's systemic reform drivers were an integral part of what the Banneker Partnership hoped to accomplish:

1. Standards-based curriculum, instruction, and assessment
2. Policy support for high quality learning and teaching
3. Convergence of educational resources
4. Partnerships and leadership: broad-based support
5. Measures of effectiveness focused on student outcomes
6. Achievement of all students, including those historically underserved.[1]

Comprehensive plans were created to develop and fully implement standards-based curriculum, instruction and assessment throughout Banneker schools. Additionally, professional development efforts, policy initiatives for high quality learning and teaching, and community partnerships at Banneker schools were developed or redesigned to address the specific student achievement goals and objectives set by the project.

A plaque outlining the "Successful Strategies" of the Banneker Partnership was observed by the site visit team at the Lothrop Science, Spanish, and Technology Center, a preK – grade 4 magnet school. These strategies are as follows:

1. High Expectations
2. High Standards for All Students
3. Goal Focused
4. Disaggregate Data
5. Data Driven Decisions
6. Parents as Partners
7. Hands on Approach to Learning
8. Student Support
9. Enrichment Experiences
10. Celebrate Accomplishments

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[1] http://www.ehr.nsf.gov/esr/drivers

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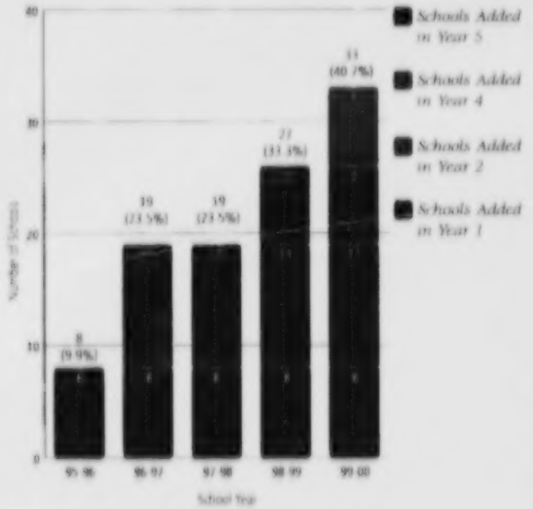
IMPLEMENTATION STRATEGIES

Banneker Partnership's focus on its principal goal of addressing the achievement gaps and enrollment disparities that existed between White students and underrepresented minorities necessitated that implementation be focused on schools that had the highest proportion of African American students.

Banneker Partnership began with the eight schools that enrolled 24% of the district's African-American population. The second year, 11 schools were added. By year four, 26 school were designated as CPMSA schools, representing 36% of all schools within the district. By the end of the CPMSA grant, 33 schools had participated in CPMSA activities, accounting for approximately 40% of the schools in the district (Ref. 8 & 2). Nineteen schools participated in the grant for at least four of the five years. These 19 schools enrolled approximately 50% of the district's African-American students.

Figure 2.1
CPMSA Schools in OPS



(%): percent of schools in district
Source: TISC, 1996, 2001; CDE 2000-2001

OPS maintained sole responsibility for implementing all aspects of Banneker Partnership. However, a number of different community partners were also directly involved in planning, developing, and sponsoring different activities. Many of these organizations were directly involved in Banneker Partnership's advisory committee. Primary partners in implementation included Creighton University, the University of Nebraska at Omaha, the University of Nebraska at Lincoln, US West, American Military Engineers, and the Urban League.

Each participating school had a Banneker Implementation Committee to coordinate execution of Banneker activities by monitoring data collection and planning school reform efforts. The Banneker Implementation Committee consisted of administrators, teachers, parents, and community representatives. Additionally, the committee was responsible for developing new instructional strategies and disseminating them among staff members in their school, with the information eventually being disseminated across the district.

Banneker Partnership's implementation design was based on the concept of site-based management. The advantage of this design was that it allowed individual schools to determine the specific needs of their teachers and students. Funds were distributed through activity specific proposals submitted to the Banneker Implementation Committee. Those teachers/administrators interested in receiving Banneker funds were required to submit a proposal outlining the details of their planned activity and how they believed their activity would help students to improve their science and mathematics skills. After the activity was over, the skills were assessed and the results were shared with the Implementation Committee. (see sample activity in Table 2.3)

Banneker Partnership leaders monitored progress and development of the grant's implementation. Bi-monthly meetings were held with senior project staff to monitor progress toward the goals. The Banneker Partnership Advisory Committee met three times each year to receive reports of project events, formative and summative evaluation results and statements from the public or participants. The Advisory Committee was made up of teachers, administrators, University professors, and local business and community leaders.

Evaluation of the project's goals and the effects of activities were based on data from standardized tests, district benchmarks of expected learning outcomes, course grades, course enrollment figures, and graduation transcripts. Implementation committees at each school kept records of project performance each semester and reported results to the Project Advisory Committee.

CURRICULUM, INSTRUCTION AND ASSESSMENT

Banneker Partnership's goals regarding mathematics and science curriculum, instruction and assessment were focused, as all of Banneker Partnership's goals were, on achieving equity for all students. Specific curriculum, instruction and assessment objectives of Banneker Partnership were aimed at correcting deficiencies or ineffective instructional practices in areas that were having a disproportionately negative impact on African-Americans students.

A primary concern of OPS and Banneker Partnership was to raise student, teacher, administrator and parental academic expectations for African-American students. CO-PI, Dr. Carol Mitchell, described the influence of CPMSA on OPS, "If we have learned anything over the past five years, we have learned that all students must be held to high standards and high expectations." Although academic "tracking" was never a policy per say at OPS, administrators report that it was an unspoken practice based on remedial course offerings in mathematics and science and the student populations that historically had enrolled in these courses (i.e. low-level classes were disproportionately comprised of African American students). During a site visit interview, one administrator commenting on the situation prior to the implementation of Banneker Partnership stated, "It was appalling to me. I walked the hallways and all our science classes—biology, chemistry—were all White and you would go to the fundamentals classrooms and 50% to 70% were African-American."

Standards

Nebraska did not have state mathematics and science standards fully implemented until SY 2000-01 (towards the end of the CPMSA grant) thus the district was the controlling body for establishing and implementing academic standards, which were referred to as Expected Learning Goals (ELG).

The district employed a curriculum evaluation process on a cyclical schedule for each subject area. This was done in four steps:

1. analysis of needs and trends
2. setting standards and goals
3. adopting materials
4. developing assessment tools and teacher aids.

Standards adopted by the National Council of Teachers of Mathematics (NCTM) and the National Research Council were used to set goals, adopt materials, and develop assessment tools and teacher aids.

Omaha Instructional Practice outcomes (OIPs) served as the benchmarks for developing standards for instruction. OIPs established a clear set of expectations and served as a reference to teachers for selecting curriculum materials and choosing effective instructional practices.

Because Nebraska did not have any state standards in place prior to 2000, no state tests were available and alternative assessment tools were used. The California Achievement Test (CAT) was used district wide and subject-specific benchmark tests were given to students to assess the ELGs established by the district. District assessments were used for all students who were not specifically excused on the basis of formal evaluation plans.

Although progress has been made in some areas in regards to fully implementing standards based practices throughout all of OPS, OPS staff acknowledged that there are continuing needs to be addressed. School administrators cite that only about 50% of schools are implementing standards well (Ref. 7). In addition, there is a strong need for more highly skilled teachers of science and mathematics to address reform needs.

Curriculum

OPS has taken a number of major steps towards district wide curriculum reform. The district began a goal-focused curriculum in 1982 when content standards for all courses were created. Additionally, assessments, including criterion based tests and judged performance have been developed and used at all levels for 15 years.

Because these content standards were in place, the primary objective of Banneker Partnership was not to overhaul the entire curriculum, as overall mathematics and science performance in the district was above the national average, but rather to ensure that equal opportunity was available to all students, particularly African-American students. Banneker Partnership curriculum reform efforts varied in purpose across schools and from classroom to classroom. This diversity was the result of the school-level implementation strategy the CPMSA employed (i.e., through specific projects led by teachers).

Despite these different activities, curriculum reform efforts upheld the primary objectives of Banneker Partnership: Raising academic standards and performance for African-American students. Banneker funds were used to support a number of different curricular reform and enhancement strategies, including:
- instructional strategies designed to meet the needs of all students
- enrichment activities exploring mathematics and science outside regular classroom instruction
- increased articulation between courses and schools regarding student expectations
- infusion of new technologies in the classroom

Table 2.2 lists some of Banneker Partnership funded curriculum enhancing proposals and the number of students impacted. All projects listed were implemented at North High School.

Table 2.2
CPMSA Funded Projects

Description	Students Impacted
Purchase of 60 calculators for Geometry and Algebra class	150 (Semester)
Transportation to University of South Dakota Math Contest	35
Elementary Science Field Day North High School students will teach a science activity to participating elementary students	400
CBL in the Classroom –Diversified and integrated Math/Science instruction	1300
Banneker Science Sequence Curriculum Development	1300
Worlds of Physics Phun. Various lab activities and lessons involving rides	100
Teaching Assistant for Calculus	30
A Jump Start in North High physics	50
Building Perspectives–software to sharpen problem solving skills	All Geometry Students

The goal of raising academic expectations also meant eliminating low-level classes. Several administrators credit Banneker Partnership as a major influence in advocating for the implementation of more rigorous curriculum standards for *all* students. According to data collected in TISC-2000, "tracking" was an unspoken practice prior to CPMSA. Course offerings in mathematics and science and the student populations typically enrolled in these courses indicated that 'tracking', although not a formal policy, was informally occurring in some schools. Administrators and staff acknowledged these practices and took steps to enact policies to ensure that this informal tracking was no longer practiced and would be continuously monitored. Administrators also cite CPMSA as having a major impact on the creation of new courses, increasing the number of existing courses. The first phase of this process occurred during SY 1997-98, when several low-level courses in science and mathematics were eliminated (Ref. 8). One school principal noted the influence of Banneker Partnership, "We eliminated dead-end classrooms and I am fully convinced that it is because of Banneker. Classes like 'Consumer Math' and 'Calculator Math' were eliminated."

Instruction

Teachers and students in Banneker schools were encouraged to use the strategy of 'journaling' (i.e., documenting thoughts and experiences that occurred during the activity) as part of their mathematics and science instruction and education. As part of the effort to share effective academic practices, a booklet was distributed throughout the district in the fall of SY 1997-98 with a collection of activities, and teacher/student comments. Table 2.3 contains excerpts from the booklet.

Student Support

The Banneker Partnership provided student academic support. One example of utilizing Banneker resources to support the increases in enrollment in challenging mathematics and science classes comes from Lewis and Clark Middle School. Lewis and Clark Middle School implemented 8th grade algebra for all students in SY 1998-99. To ensure that increased academic assistance was available to support the increases in enrollment, Lewis and Clark used Banneker Partnership as a means to introduce the use of manipulatives in the classroom and supplemental Algebra enrichment classes.

Banneker Partnership funds were used to hire three tutors for the Enrichment Center at North High School. The Enrichment Center was established to encourage students to continue and intensify their studies in the areas of mathematics, science, and technology. Prior to the employment of the tutors, students only had the option to work with their specific teacher.

There are mathematics and science tutors as well as peer tutoring available. There are also six computers for student use. Enrichment Center staff report that they have received correspondence from teachers citing increased attendance, grade improvement, enthusiasm for course work by the students and improvement in grades. Additionally, staff report that students attending the center have gained confidence.

One administrator speaking of the benefit of the tutors added "We found that these tutors were a 'safety net' for those kids who are struggling or a little bit out of their comfort zone."

PROFESSIONAL DEVELOPMENT

Banneker Partnership staff recognized that the quality of teaching was a key component in achieving the grant's ultimate objective. Banneker Partnership's influence was a main factor in OPS's acknowledgement of the diverse population and learning styles that existed within the district. Professional development opportunities were refocused to adapt instruction to meet the needs of all students in the classroom. Because district policies concerning mathematics and science were reformed to encourage more students to enroll in science and mathematics courses, addressing the wider range of learning styles and abilities was a necessity, so that the success rate in these courses did not fall.

CPMSA staff were directly involved in offering professional development opportunities for teachers. During the first year alone, Banneker Partnership staff offered the following professional development programs:

- Science Share-a-Thon
- Parent Panel on Parent Involvement
- Banneker Retreat
- Banneker Equity Workshop for secondary mathematics and science teachers.

Driven in part by Banneker Partnership's influence, professional development practices underwent several important changes from SY 1995-96 to SY 1999-00. According to TISC-2001, three specific amendments to professional development practices stood out as being the most significant.

Table 2.3

Banneker Partnership Activities

Activity Description	Comments
Elementary School	
Multi-Level Ecosystem. Students construct three level ecosystem using two liter bottles.	**Teacher Comments** "The activity was excellent. I would contact Pepsi® for uniform bottles in the future. The FishBowl® donated snails and gravel, PetSmart® donated algae and fish... Students discussed the relationship between the levels and between producers, consumers, decomposers, and the environment."
High School	
Minority Scientist's Contribution. Students were given an assignment to use the media center and other resources to prepare written reports on contributions made by minority scientists.	**Student Comments** "I learned that scientists came from different places around the world. Also that they came from different backgrounds." "If minorities of the past could be so successful while so much discrimination was taking place, the minorities of the future, without discrimination, will be very successful."

First, practices were modified to ensure that the district's professional development efforts were aligned with the district's adopted curriculum standards. Prior to CPMSA, administrators acknowledged that professional development efforts were not clearly linked to the district's curriculum standards. OPS aligned professional development plans to specifically address the district and school priority content standards as part of the overall school improvement plan. This consolidation of professional development efforts and curriculum standards resulted in a professional development program that was more unified than it had been in the past.

Second, policies and programs were created to ensure that new teaching practices learned in professional development sessions were shared throughout the district. In 1996, OPS created policies to require teachers to report on the results of new teaching methods learned through professional development activities. At the heart of the initiative to encourage teachers to share teaching practices was the creation of PEERS (Promoting Excellence, in Education Regionally & Statewide). PEERS was the result of a partnership among the Nebraska Math and Science Initiative (NMSI), OPS, and Banneker Partnership. PEERS was a five-day (35 hours) annual workshop, held primarily during the summers with follow-up meetings during the year (20 hours).

The program was designed to help teachers develop the knowledge and skills necessary to enhance the teaching of mathematics and science. From the inception of Banneker Partnership, over 145 teachers have participated in PEERS.

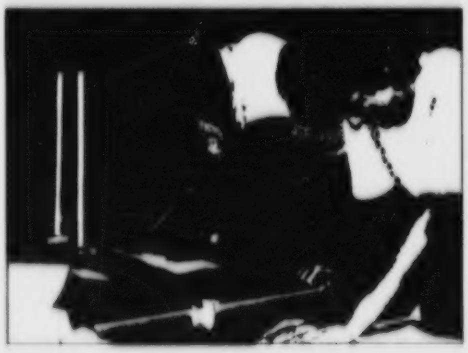
The PEERS workshops' primary objectives were as follows:

- identify and use concepts of mathematics and science
- use and develop a variety of assessment strategies
- provide culturally relevant classroom experiences for all students
- use technology as tools to facilitate the teaching of mathematics and science
- use tools and skills developed in the workshop to create a collaborative learning environment

Third, professional development activities (e.g., workshops, training sessions) were reformed based on teacher input to include instructional support during the sessions and follow-up meetings. The follow-up sessions have been credited with improving the level of implementation and quality of newly learned teaching practices.

Administrators assert that the contributions of Banneker Partnership to professional development extend beyond the workshops and training offered. CPMSA is also credited with reshaping the philosophy with which teachers approach professional development. The 1998 Banneker Partnership annual report describes how Banneker led to a greater understanding of the long-term positive impact of professional development, "Teachers are always willing to attend professional development sessions that promise "next-day" results. Banneker Partnership has begun to break down this notion." One administrator, commenting on the impact CPMSA has had on the improved culture of professional development, portrayed the new mindset as one where expectations for teacher collaboration are high, "If you are really good at teaching kids to multiply, then you have an obligation to teach other teachers."

Banneker Partnership has reached a significant proportion of mathematics and science teachers in the district. At the end of the grant, 44% of elementary school teachers, 93% of middle school teachers, and 96% of high school teachers had participated in documented professional development directly related to Banneker Partnership goals (Ref. 7).



POLICY

Banneker Partnership has had formal and direct influence on policies adopted by the OPS school system. Although Banneker Partnership focused on African-American students, CPMSA grant leaders and school administrators credit the initiative with improving policy decisions throughout the district by serving as a model for implementing curricular and professional development reform.

The primary effect that OPS leaders credit to Banneker Partnership is increasing the awareness and concern that OPS policy decisions have with respect to the question of 'equity' for students in their educational experience. First and foremost, the grant forced administrators to ask the question "how do policies contribute to (or hinder) closing the achievement gap in mathematics and science between White students and underrepresented minorities?"

Policies eliminating dead end classes were the most successful in closing the enrollment gaps that existed between Whites and African-Americans. Prior to and during Banneker Partnership the district only required two years of mathematics and two years of science for OPS students to graduate. Many administrators and teachers sought to increase these requirements. Increasing the minimum mathematics and science requirements was also a goal of Banneker Partnership because of the district's past experience of channeling certain students towards the minimum requirements. Although no change in mathematics and science requirements was implemented during the five years of the grant, a policy change for mathematics and science graduation requirements was approved in 2000 and was in effect for the freshman class of 2001-02. Beginning with the Class of 2005, OPS students are required to complete three years of mathematics (Algebra I, Geometry, and Algebra II) and three years of science (Biology, Chemistry and Physics).

An important contribution of Banneker Partnership to policy decisions in general was the importance placed on using data disaggregated by race and distributing the data throughout the school district to drive policy and education decisions. In one case, data disaggregated by race resulted in the restructuring of curriculum. North High School used disaggregated data supplied by the Banneker Partnership office to identify the need to increase the enrollment in physics at their school. The data indicated that physics was the core science course with the lowest enrollment and completion rates. North High School responded with the creation of a new physics course that included the same standards, but eliminated the level of "elitism associated with the traditional Honors Physics." Moreover, a mathematics and science enrichment room was established to provide teacher and peer tutoring every period throughout the school day. During the CPMSA implementation years, African-American achievement progressed in several areas at North High School. For example, the number of African-American graduates successfully passing biology, chemistry and physics increased from 4.7% in 1993-94 to 22.2% in SY 1999-00. In addition, the gap between White and African-America students decreased from 16.7 percentage points (pp) in 1994-95 to 4.6pp in SY 1999-00 (Ref. 10).

One administrator, commenting on the positive impact of the grant on policy decisions, stated, "We truly believe we would not be where we are at today had it not been for the initial grant that served as a springboard to raise consciousness about the issue."

Table 2.4

Overview of Policy Changes to Support Student Success in Math and Science During CPMSA Implementation

School Year	Policy Implemented
1994-95 (Baseline Year)	Tracking was unspoken practice
1995-96	No changes reported
1996-97	Minorities encouraged to enroll in upper level courses. Teacher professional development actively incorporated methods to encourage and support African-American students in science and mathematics courses
1997-98	More sections of upper level courses are offered
1998-99	• Tracking no longer practiced and is monitored. • Low level courses in science and math have been eliminated
1999-00	Graduation requirements strengthened to 3 years of math (Algebra I & II, Trigonometry/Pre-Calculus) and 3 years of science (Biology through Physics). Changes will be implemented in SY 2001-02.

Source: TISC 2000-01

PARTNERSHIPS

From the beginning of Banneker Partnership, different members of the community have been actively involved with CPMSA. Community members serve on the advisory committee, the Governance Board, and on individual school implementation committees.

Banneker Partnership activities have received broad based support from all segments of the community, including parents, businesses, community members, churches, non-profit agencies, and local institutions of higher education. The overall outcome for partnerships has been a shared emphasis on mathematics and science, ultimately resulting in a greater capacity to provide services to students and teachers. Banneker Partnership staff have stated that partnerships have helped to reinforce the focus and commitment of CPMSA, and have established a base of support from the community.

Partnerships with Business/Industries and Community Groups

A number of businesses/industries and community groups formed successful partnerships with OPS to offer support to mathematics and science students. Community based groups were primarily involved in offering volunteers, space, and material resources for tutoring and students enrichment. For example, Girls Inc., a national nonprofit youth organization, provided the site and personnel for a two-week science camp. The Zion Baptist Church provided the site and 11 volunteers for a one-week science, mathematics, and technology camp. During the summer of 1997, the communication company US West in collaboration with Banneker, OPS, and Senator Bob Kerrey's office funded a summer camp for 230 students that promoted pre-algebra skills. US West subsidized teacher pay for the camp.

Partnerships with Universities

Partnership with colleges and universities were an integral part of OPS's STEM reform agenda. The University of Nebraska of Omaha (UNO) was an active partner with Banneker Partnership. This partnership was part of the Centers of Excellence for Research Training and Learning (CERTL) project. CERTL is a program sponsored by the National Science Foundation and the National Institute of Health to support the CPMSA program. CERTL's prime mission is to enlist the participation of science education programs at local colleges and universities using the National Science Education Standards (NSES) as a guide to enhance and improve pre-college education through collaboration with the local school district. BannekerPLUS was the CERTL program for Omaha.

BannekerPLUS had three primary objectives: (1) provide staff development so that instruction would meet NSES standards, (2) involve students and teachers with University staff for enrichment and motivating inquiries, and (3) complete educational research as a basis for changing K-12 instruction and teacher development programs. Table 2.6 describes some of the CERTL professional development activities.

Table 2.5

Partnership Organizations

Organization Type	Organizations	Programs/Services
Community Based Sites	• Mt. Nebo Baptist Church • Zion Baptist Church • Girls, Inc. • Wintergreen Apartments • Charles Washington Library • Hastings College • College of St. Mary	• Student support for tutoring and enrichment (in-kind services) • Science, mathematics and technology camps
Business and Industry	• US West • Tires, Inc. • ACI • Norwest Bank	• Success Unlimited in Mathematics and Science (S.U.M.S) program • Adopt-a-School Program
University Partners	• University of Nebraska-Omaha • Creighton University	• AIM for STARS camps • Student Scholarships • BannekerPLUS (Centers of Excellence for Research, Training and Learning)
Parents	• CPMSA Schools	• Parent School Agreement

Table 2.6

CERTL Professional Development Activities

Activity	Description
NASA Hands-on-Space Workshop (14 hours each for 8 teachers)	Sponsored by NASA and coordinated by CERTL, this program allowed eight teachers involved in the project to participate in an intensive, onsite, and hands-on workshop at no cost. The workshop demonstrated hands-on lessons to help teach students about the mathematics and science related to space flight.
Space Seminar Day (7 hours each for 22 teachers).	Guest speakers and lessons related to rocket science, and the physics of space travel and resource activities and sites available on the World Wide Web. Teachers also received a variety of materials and software related to space.
Internet Based Web Sites for Mathematics and Science (2 hours each for 40 teachers).	Teachers were provided with hands-on experiences related to Internet sites for mathematics and science education.
Teacher and Student Field Trip to UNO (2 hours each for 9 teachers and approximately 200 elementary and secondary students).	Teachers from Skinner Elementary School, Hale Middle School, and Central Park Elementary School, took their students to a field trip to the UNO Space Shuttle Simulation Laboratory. Students took part in a Space Shuttle Simulation experience, and their teachers designed follow-up curriculum activities.

Partnerships with Parents

Establishing a "partnership" with parents to support their children's mathematics and science schoolwork was a key objective for Banneker Partnership and OPS. Teachers and administrators believed that parental involvement was especially important in African-American families, particularly for children who were struggling in school. Past efforts to engage parents with their children's mathematics and science education was a challenge. One teacher, describing the initial challenge of getting parents involved with their student's mathematics and science coursework, stated, "There was a lot of apprehension at first. A lot of times parents did not have good feelings about upper level math classes themselves."

Banneker Partnership staff initiated a number of different activities that were aimed at encouraging greater parental participation in school activities. At the start of the grant, many schools in the district had "Banneker kick-off" meetings to introduce the goals of the CPMSA grant to parents. Additionally, quarterly newsletters from the Banneker Partnership office were distributed to the community and were instrumental in raising awareness about the project.

The Banneker Partnership's work to engage parents in their student's mathematics and science coursework was highlighted by the School/Parent Agreement. The School/Parent Agreement was a document created by Banneker Partnership in conjunction with each Banneker school to 1) explicitly communicate the importance of parent involvement to the school by having the school principal sign an agreement promising to execute a number of activities related to Banneker Partnership with the parents, and 2) increase parental participation by having each parent sign the agreement promising to execute a number of activities related to their child's mathematics/science experience. Table 2.7 lists the conditions of the Banneker School Parent Agreement.

Data were not available for all years of the grant to gauge the overall impact of the agreement. However, data from the SY 1996-97 indicate that the School/Parent Agreement was successful in reaching a substantial portion of the parents with children in CPMSA schools. The 1997 annual report states that 4,451 School/Parent Agreements were signed through SY 1996-97. In addition, the report cites that African-American families had a higher response rate than the district as a whole (36% of African-Americans vs. 30% of the district as a whole), suggesting that Banneker Partnership was successful in reaching its target population. Additional evidence of success in reaching African-American families comes from a mail survey sent to African-American parents about the CPMSA grant (survey was administered by Banneker Partnership). Some encouraging parental comments documented in the 1998 annual report are listed here.

"The school has opened doors for my child that had never been expanded on in my day. I am thankful for the Banneker Partnership."

"I wish the CPMSA could have been around when I attended school ....It will certainly keep other students from struggling through math as long as I did."

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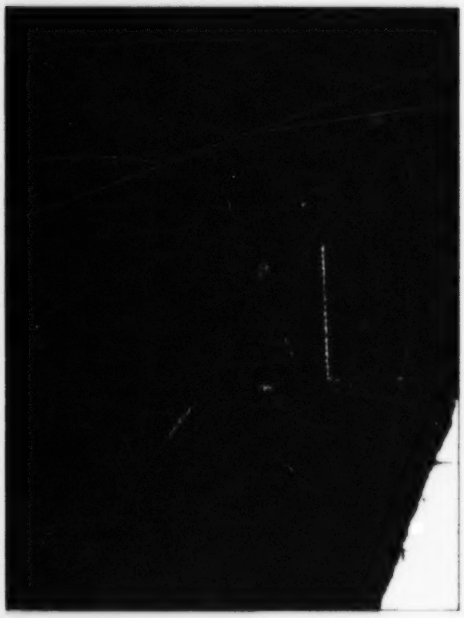
Table 2.7

Example Banneker Partnership School–Parent Agreement

Principal/School	Parent
From our school we agree to use resources from Banneker Partnership to do the following: • Get your approval on all enrollments and course changes affecting your child • Visit personally with your son or daughter about science and mathematics and encourage your child to study these subjects • Use teaching methods that encourage excellence in mathematics and science • Encourage and recruit your child to participate in school activities, especially those related to mathematics and science • Provide special support to help improve study skills and meet school representatives • Provide enrichment activities in mathematics and science • Inform you if your child is having difficulty • Provide you with information about career choices that require skills in mathematics and science • Inform you about special events and opportunities provided for your child • Cooperate with neighborhood services to provide information and improve communication between schools and parents	I plan to help ___________ be successful in the study of mathematics and science in the Omaha Public Schools by doing the following: • Talk regularly with my child about school activities and studies • Check to see homework is completed daily • Limit television and other activities that interfere with school requirements • Attend regularly scheduled parent teacher conferences (twice each year) • Visit mathematics and/or science classes each year • Attend school activities with my child • Encourage my child to participate in special opportunities that are available (like science fairs, workshops, summer camps) related to science and mathematics • Inform the teacher and principal immediately when my child is having difficulty in school subjects • Assure my child keeps regular hours and gets necessary sleep to be ready for school For my Middle Level/ High School son or daughter, I will also do the following: • Approve all the courses my son or daughter enrolls in and encourage him or her to study mathematics and science • Limit the number of hours my son or daughter is employed and assure the responsibilities at school are met without interference because of a job

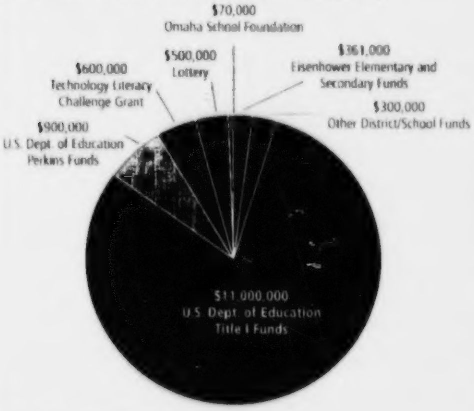


RESOURCE CONVERGENCE

In addition to the CPMSA grant, OPS had a number of different funding sources directed toward reforming mathematics and science. Figure 2.2 lists additional sources of resources that were used to support mathematics and science education. These additional funds were used across a wide range of reform areas. For example, $300,000 of Eisenhower Elementary and Secondary Funds were used to support curriculum and instructional material development, professional development, and central administration/coordination. Perkins funds were utilized to facilitate restructuring in one school and support curriculum writing and staff development at another. Title I funds were used in part to purchase technology support for Banneker schools. Other examples include a $600,000 Technology Literacy Challenge Grant used to support professional development and the improvement of curriculum and instructional material, and the state lottery fund used to purchase curriculum materials and classroom supplies.

Figure 2.2

Additional OPS Funding (SY 2000-01)



Source: CDE 2000-01

LEADERSHIP

OPS Assistant Superintendent Dr. Joseph P. Gaughan set the vision and charted the direction for the Banneker Partnership during the first two years of the grant. Starting in SY 1997-98, Dr. John Mackiel moved into the superintendent position and also led the CPMSA project as Principal Investigator. He met monthly with Co-PI Dr. Carol Mitchell, Dr. Ron Meyer, Special Project Director for OPS, and Project Director Rebecca Nichol. Banneker Partnership staff credit the stability of their team as an important factor in Banneker Partnership's success and the Urban Systemic Program (USP) award they received in 2000 to continue with their systemic reform efforts.

CENTRAL PARK
ELEMENTARY SCHOOL

STUDENT ACHIEVEMENT

This section presents an analysis of Omaha Public Schools student achievement relevant to the CPMSA goals for student outcomes defined in the Cooperative Agreement with NSF. The program emphasized seven student achievement goals from the baseline year to SY 1999-00 as follows:

A. Algebra I in 8th Grade: improving course completion rates
B. Algebra I in 9th Grade: improving course completion rates
C. Geometry in 10th Grade: improving course completion rates
D. Trigonometry/Pre-calculus, or Calculus: improving course completion rates by graduation
E. Physics, Biology and Chemistry: improving course completion rates by graduation
F. 2nd, 4th and 6th Grade Mathematics Assessments: increase passing rates
G. Increase the 2nd, 6th, 7th, and 8th grade science assessment passing rates

This section also presents additional analysis of mathematics and science outcomes in the following areas:

H. Advanced Placement Mathematics and Science Exam Results
I. College Entrance Examinations Results
  i. SAT Mathematics
  ii. ACT Mathematics and Science Reasoning

GOAL A. Algebra I in 8th Grade: Improving Course Completion Rates

The number and percentage of total underrepresented minority 8th grade students in the Omaha Public Schools who successfully complete Algebra I shall increase from 59 or 7% of minority 8th graders, to 186 or 20% of the total minority 8th graders over the five year period of the award.

As shown in Figure 2.3, the percentage of underrepresented minority students enrolled in CPMSA schools successfully completing Algebra I (grade "C" or above) in 8th grade increased from 59 (7% of the total 8th grade population) in baseline year to 156 (11%) by SY 1999-00. The goal for successfully completing Algebra I in 8th grade was not met, however, steady progress has been made.

Enrollment more than doubled between SY 1994-95 and 1999-00; as the challenge of maintaining and increasing passing rates is addressed it is expected that the percentage of students successfully completing Algebra I in 8th grade will climb.

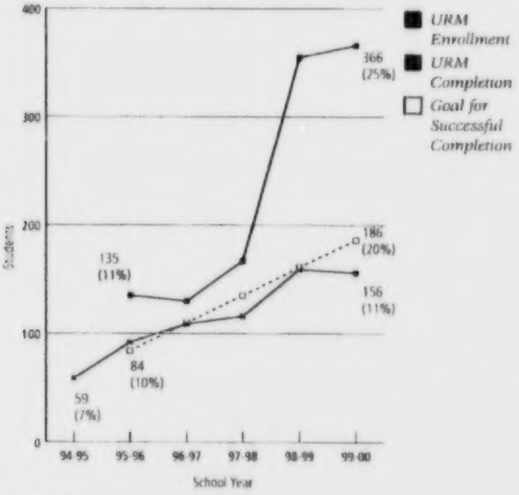
Figure 2.3

8th Grade Algebra I Enrollment and Successful Completion by URM Students from Baseline Year to SY 1999-00

SY	Baseline	95-96	96-97	97-98	98-99	99-00
Total G8 URM Population (A)	n.a.	1,223	1,271	1,425	1,367	1,440
Enrollment (B)	n.a.	135	130	167	355	366
% Enrolled (B/A)	n.a.	11%	10%	12%	26%	25%
Completion (C)	59	92	109	116	159	156
% Completed (C/A)	7%	8%	9%	8%	12%	11%
# Completed Goal		84	110	135	161	186
% Completed Goal		10%	12%	15%	17%	20%

Note: Successful completion = Grade 'C' or above

URM includes American Indian, Alaskan Native, Black, and Hispanic



Source: TISC-2002

GOAL B. Algebra I in 9th Grade: Improving Course Completion Rates

> The number and/or percentage of the total of underrepresented minority 9th grade students in the Omaha Public Schools who successfully complete Algebra I shall increase from 93 or 9% of minority 9th graders, to 368 or 35% of the total minority 9th graders over the five year period of the award.

The number of underrepresented minority 9th grade students enrolled in Algebra I increased from 481 to 683 from SY 1995-96 to 1999-00, as illustrated in Figure 2.4. The number of students successfully completing the course also increased from 93 in the baseline year to 132 by SY 1999-00. However, the overall percentage of underrepresented minority students completing the course fell from 9% to 7%. This outcome was not reflective of the goal.

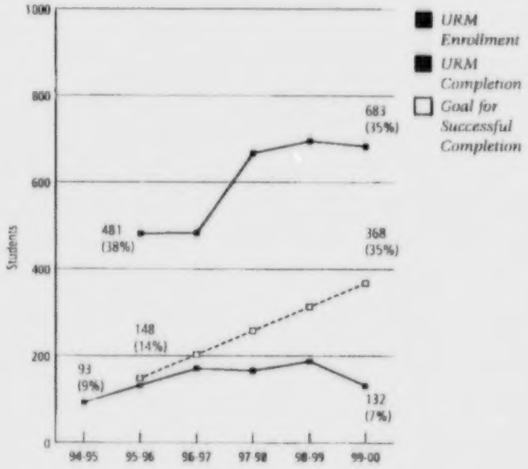
Figure 2.4

9th Grade Algebra I Enrollment and Successful Completion by URM Students from Baseline Year to SY 1999-00

SY	Baseline	95-96	96-97	97-98	98-99	99-00
Total G9 URM Population (A)	n.a.	1,279	1,293	1,729	1,907	1,940
Enrollment (B)	n.a.	481	483	667	695	683
% Enrolled (B/A)	n.a.	38%	37%	39%	36%	35%
Completion (C)	93	132	171	166	188	132
% Completed (C/A)	9%	10%	13%	10%	10%	7%
# Completed Goal		148	203	258	313	368
% Completed Goal		14%	19%	25%	30%	35%

Note: Successful completion = Grade 'C' or above

URM includes American Indian, Alaskan Native, Black, and Hispanic



Source: TISC-2002

GOAL C. Geometry in 10th Grade: Improving Course Completion Rates

> The number and/or percentage of underrepresented minority 10th graders in the Omaha Public Schools who successfully complete Geometry shall increase from 79 or 12% of minority 10th graders, to 333 or 50% of the total minority 10th graders over the five year period of the award.

Data specific to 10th grade geometry enrollment and successful completion were unavailable. Underrepresented minority student enrollment and successful completion rates in geometry in grades 9–12 were used as an alternative indicator of success for this goal.

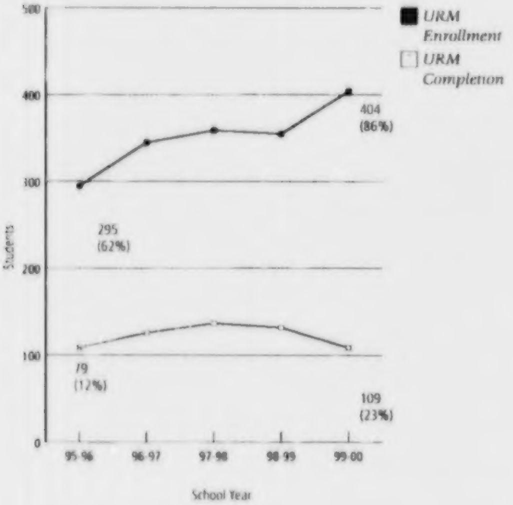
As shown in Figure 2.5, enrollment has increased from 295 (62%) to 404 (86%) from SY 1995-96 to 1999-00. The number of underrepresented minority students completing the course remained the same at 109 (23%). Successful completion rates for these students reached five-year highs of 137 (24%) and 132 (23%) students in SY 1997-98 and 1998-99 respectively. Successful attainment of this goal could not be determined using available data.

Figure 2.5

9-12th Grade Geometry Enrollment and Successful Completion by URM Students from Baseline Year to SY 1999-00

SY	95-96	96-97	97-98	98-99	99-00
Total G9-12 URM Population (A)	477	556	561	568	468
Enrollment (B)	295	345	359	355	404
% Enrolled (B/A)	62%	62%	64%	63%	86%
Completion (C)	109	126	137	132	109
% Completed (C/A)	23%	23%	24%	23%	23%

Note: Successful completion = Grade 'C' or above.
URM includes American Indian, Alaskan Native, Black, and Hispanic



Source: TISC-2002
(%) The percentage of the total 9-12th grade URM population

GOAL D. Trigonometry/ Pre-Calculus or Calculus by Graduation: Improving Course Completion Rates by Graduation

The number and/or percentage of underrepresented minority high school graduates in the Omaha Public Schools who successfully complete Trigonometry/pre-calculus or calculus shall increase from 43 or 10% of minority graduates to 128 or 30% of the total minority high school graduates over the five-year period of the award.

According to the "Banneker 2000: Community of Excellence in Math and Science Annual Report", the number of African American students graduating with trigonometry/pre-calculus or calculus courses rose from 43 to 89 from SY 1995-96 to 1999-00, or from 10% to 17% of the total number of graduating African American students for that period. This data does not include Native American or Hispanic students and is not representative of all underrepresented minority high school graduates.(Ref. 7)

Available data from TISC-2002 that most closely reflects this goal showed that the number of underrepresented minority students in grades 9-12 successfully completing these courses increased by 2 percentage points, or 109 students from 10% (43) to 12% (152 of 1,238) from baseline to SY 1999-00. This data cannot be used to assess attainment of Goal D.

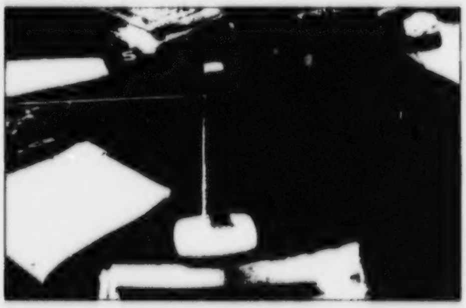


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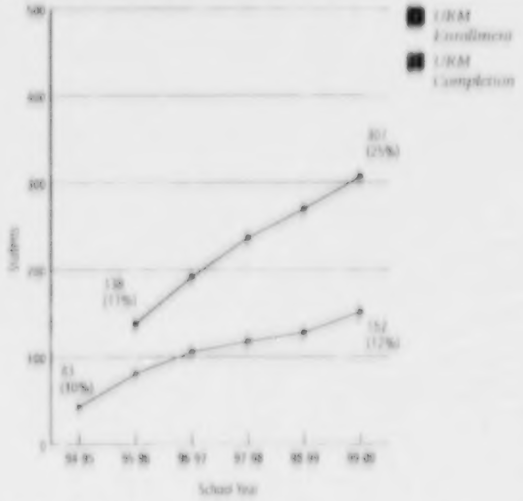
Figure 2.6

9–12th Grade Trigonometry/Pre-Calculus & Calculus Enrollment and Successful Completion by URM Students from Baseline Year to SY 1999-00

SY	[illegible]	95-96	96-97	97-98	98-99	99-00
Total G9-12 URM Pop. (A)	n.a.	1,298	1,389	1,216	1,154	1,238
Enrollment (B)	n.a.	138	192	237	270	307
% Enrolled (B/A)	n.a.	11%	14%	19%	23%	25%
Completion (C)	43	81	106	118	128	152
% Completed (C/A)	10%	6%	8%	10%	11%	12%

Note: Successful completion – Grade 'C' or above

URM includes American Indian, Alaskan Native, Black, and Hispanic



Source: TISC 2002

(%) The percentage of the total 9-12th grade URM population

GOAL E. Physics, Biology and Chemistry: Improving Course Completion Rates by Graduation

> The number and/or percentage of underrepresented minority high school graduates in the CPMSA participating schools who successfully complete physics, biology, and chemistry shall increase from 18 or 4% of minority graduates to 128 or 30% of the total minority high school graduates over the five-year period of the award.

Specific data regarding the number of CPMSA students who took physics, biology, and chemistry by graduation were unavailable. The number and percentage of graduating students deemed "SEM Proficient" were used in this analysis. SEM Proficiency is defined as the successful completion of the minimum requirements of pre-calculus, biology, and chemistry and/ or physics, indicating that graduates were "proficient to pursue SEM undergraduate study."

In SY 1995-96, 53 or 11% of Omaha Public Schools' underrepresented minority graduates from participating CPMSA schools were SEM proficient. By SY 1999-00, that number increased to 100, or 16% of the total number of underrepresented minority graduates. The trend in underrepresented minority graduate SEM proficiency was positive, but it cannot be used to assess successful attainment of this goal.

Figure 2.7

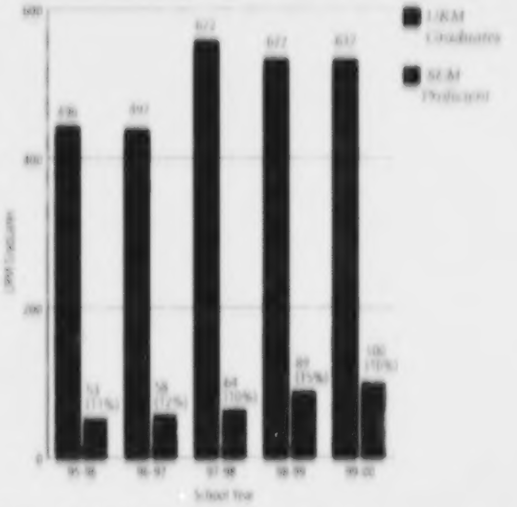
SEM Proficiency Trends of URM Graduates from Baseline to SY 1999-00

SY	95-96	96-97	97-98	98-99	99-00
Number of 12th Grade URM Graduates (A)	496	497	622	609	632
Number of SEM Proficient[*1] Students (B)	53	58	64	89	100
% SEM Proficient (B/A)	11%	12%	10%	15%	16%

Note: Successful completion – Grade 'C' or above

URM includes American Indian, Alaskan Native, Black, and Hispanic

[*1] SEM Proficiency defined as those who have completed a minimum of Pre-Calculus, Biology, and Chemistry and/or Physics courses



Source: TISC 2002

(%) The percentage of the total 9-12th grade URM population

GOAL F: 2nd, 4th, and 6th Grade Mathematics Assessment: Increasing Passing Rates

The projected increase in the number and/or percentage of minority students in Grades 2, 4, and 6, in the CPMSA participating schools who achieve the 50th percentile or higher on the composite mathematics score of the California Achievement Test (CAT-5) over the five year period of this award are as follows:

Table 2.8

Composite California Achievement Test (CAT-5) Mathematics Score Goals

	SY 1994-95	SY 1999-00
Grade 2	354 (40%)	566 (66%)
Grade 4	247 (42%)	398 (67%)
Grade 6	175 (37%)	295 (63%)

The Banneker 2000 Annual Report presented data for second grade students. This data indicated a 16 percentage points increase overall from 57% in SY 1994-95 to 73% in SY 1999-00 of second grade students in CPMSA schools scoring at or above the 50th percentile on the CAT-5. Disaggregated race/ethnicity data were unavailable, making goal attainment analysis unfeasible.

As shown in Figure 2.8, 4th grade data from TISC 2002 indicate that in SY 1996-97 46% (451 of 986) of underrepresented minority students in CPMSA schools achieved the 50th percentile or higher on the district test. In SY 1999-00, 45% (568 of 1,262) scored at or above the 50th percentile. Since the URM 4th grade population increased to 1,027 by SY 1999-00 the numerical goal of 566 students was exceeded, but the goal of 63% of total 4th graders passing CAT-5 was not met.

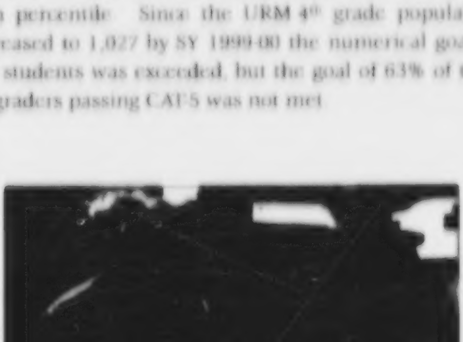
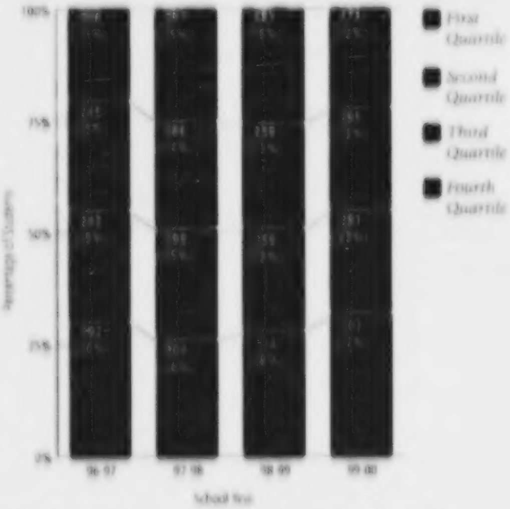


Figure 2.8

4th Grade Underrepresented Minority Students Mathematics Test Results from SY 1996-97 to 1999-00

SY	96-97	97-98	98-99	99-00
Total G4 Population	2,692	2,837	2,839	2,888
G4 URM (A)	986	1,180	1,115	1,262
Num. URM Passing (B)	451	377	542	568
% URM Passing (B/A)	46%	32%	49%	45%

Note: Passing = Scoring in First or Second Quartile.
URM includes American Indian/Alaska Native, Black, and Hispanic.



Note: Sum of Quartiles may not equal 100% due to rounding. (%): The percentage of the total 4th grade URM population.
Source: TISC 2002

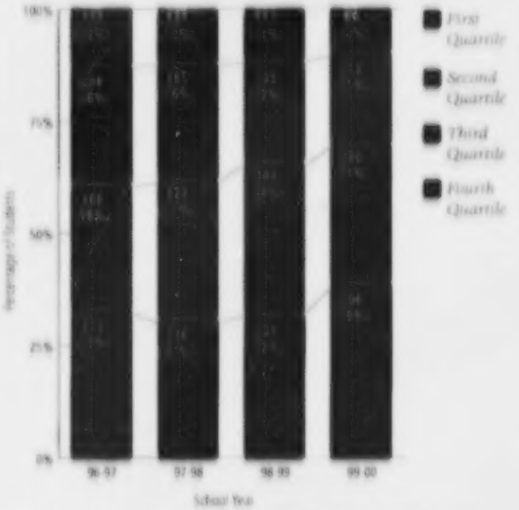
Assessment data were not available for grades 2 or 6. Eighth grade data were used as an indicator of middle school achievement. Eighth Grade Data indicate that in SY 1996-97 38% (363 of 945) of underrepresented minority students in CPMSA schools scored at or above the 50th percentile on the mathematics portion of the CAT-5 assessment, as shown in Figure 2.9. By SY 1999-00 these numbers declined by 7 percentage points (38% to 31%) from SY 1996-97 levels.

Figure 2.9

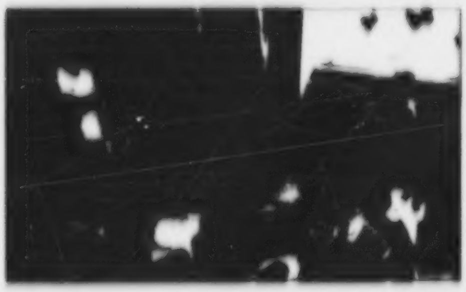
8th Grade Underrepresented Minority Students Mathematics Test Results from SY 1996-97 to 1999-00

SY	96-97	97-98	98-99	99-00
Total G8 Population	2,700	2,716	2,684	2,656
G8 URM (A)	945	1,031	1,005	1,027
Num. URM Passing (B)	363	392	336	311
% URM Passing (B/A)	38%	38%	33%	31%

Note: Passing = Scoring in First or Second Quartile
URM includes American Indian/Alaska Native, Black, and Hispanic.



Note: Sum of Quartiles may not equal 100% due to rounding. (%) The percentage of the total 4th grade URM population
Source: TISC-2002



GOAL G. 2nd, 4th, and 6th Grade Mathematics Assessment: Increasing Passing Rates

The projected increase in the number and/or percentage of minority students in grades 2, 6, 7, 8, in the CPMSA participating elementary and middle schools who achieve 80% or higher on the science outcomes of the District Benchmark Assessment program over the five year period of the award are as follows.

Table 2.10

Goals for Grades 2, 6, 7, and 8 in CPMSA Schools on the District Benchmark Assessment

	SY 1994-95	SY 1999-00
Grade 2	482 (57%)	686 (80%)
Grade 6	46 (12%)	187 (40%)
Grade 7	436 (41%)	737 (70%)
Grade 8	100 (12%)	475 (55%)

There were no data available with regards to Goal G.

COLLEGE ENTRANCE EXAM RESULTS

Advanced Placement Exams

Results on mathematics and science Advanced Placement (AP) tests taken by 11th and 12th grade students from 1995 to 2002 were used to assess progress toward college-level work in Omaha Public Schools. The number of tests taken is an indication of the number of students enrolling in Advanced Placement classes; the number scoring 3 or above is a measure of achievement.

Mathematics

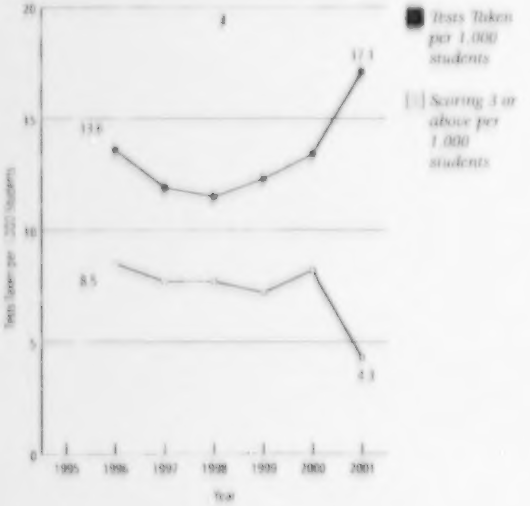
In May 1995, a total of 74 AP exams in Calculus AB, BC and/ or Statistics were taken. 38 (51%) of these exams scored 3 or above, earning college credit. The number of tests taken was stable until 2000, when 69 tests were taken with 42 (61%) scoring 3 or above. In 2001, the number of tests taken in these subjects rose to 87 with 22 (25%) scoring 3 or above. A further increase in tests taken was seen in 2002 when 117 tests were taken, with 36 (31%) scoring 3 or above.

Figure 2.10

AP Mathematics Test Results from May 1995 to 2002

	1995	1996	1997	1998	1999	2000	2001	2002
Total 11th and 12th Grade Population	•	4,570	4,779	5,047	5,116	5,132	5,074	•
Tests Taken Calculus AB, BC and Statistics	74	62	57	58	63	69	87	117
Tests Taken per 1,000 Students	•	13.6	11.9	11.5	12.3	13.4	17.1	•
Scoring Above 3	38	39	37	39	37	42	22	36
Tests Scoring 3 or Above per 1,000 Students	•	8.5	7.7	7.7	7.2	8.2	4.3	•

Note: Mathematics AP Exams include Calculus AB, BC, and Statistics
• Data not available



Source: TISC-2002

Science

The overall number of tests taken in science (Biology, Chemistry, Environmental Science, and Physics - B, Mechanical and Electrical) increased from 65 in May 1995 to 86 in May 2002. The number of science tests taken scoring 3 or above increased from 38 to 51 during this period as shown in Figure 2.11.

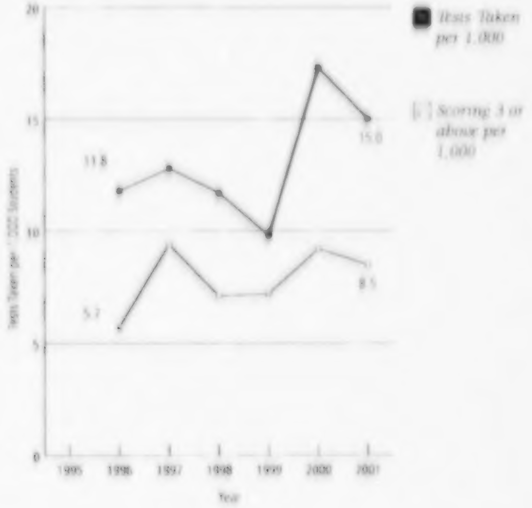
The number of tests taken and scoring 3 or above was relatively unchanged until May 2000 when both the number of tests taken and the number scoring 3 or above increased to the highest points during the CPMSA program at 89 and 47 respectively. Underrepresented minority student test taking increased from zero tests taken in 1995 to seven by 2002, with four of the seven (57%) scoring 3 or above in 2002.

Figure 2.11

AP Science Test Results from May 1995 to 2002

	1995	1996	1997	1998	1999	2000	2001	2002
Total 11th and 12th Grade Population	•	4,570	4,779	5,047	5,116	5,132	5,074	•
Tests Taken	65	54	61	59	50	89	76	86
Tests Taken per 1,000 Students	•	11.8	12.8	11.7	9.8	17.3	15.0	•
Scoring Above 3	38	26	45	36	37	47	43	51
Tests Scoring 3 or Above per 1,000 Students	•	5.7	9.4	7.1	7.2	9.2	8.5	•

Note: Science AP tests include Biology, Chemistry, Environmental Science, Physics B and C, (Mech. and Elec.)
• Data not available



Source: TISC-2002

SAT Results

Overall Scholastic Assessment Test (SAT) mathematics scores improved by twenty points from 523 to 543 between SY 1994-95 and SY 2001-02. The scores of underrepresented minority students (Black and Hispanic) increased 28 points from 417 to 445 over the same time period. Race/ethnicity data from SY 1997-98 to 2001-02 show that Black students improved by 25 points (6%) from 420 to 445 on the mathematics section of the SAT, while the mean score of Hispanic students improved 104 points (26%) from 397 to 501 between SY 1997-98 and 2000-01. In SY 2000-01, the average score for underrepresented minority students was 455 points, the highest average of the five-year CPMSA time period.

Figure 2.12

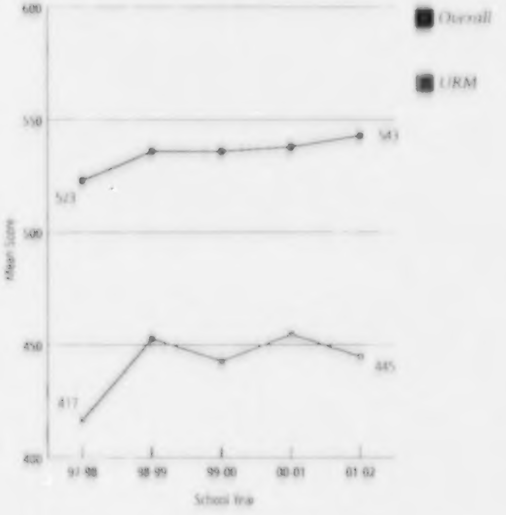
SAT Mathematics Mean Scores Overall and URM from SY 1997-98 to 2001-02

	SY	97-98	98-99	99-00	00-01	01-02
Total G12 Population		2,339	2,466	2,423	2,394	m
G12 URM Population		651	741	730	795	m
Overall	Number of Test Takers	377	385	359	380	328
	% of Population	16%	16%	15%	16%	m
URM	Number of Test Takers	51	57	44	48	41
	% of URM Population	8%	8%	6%	6%	m
Mean Mathematics Scores	Overall	523	536	536	538	543
	URM	417	453	443	455	445(*)

m: missing data

URM: includes African American and Hispanic students

(*) African American students only, less than 5 Hispanic test-takers



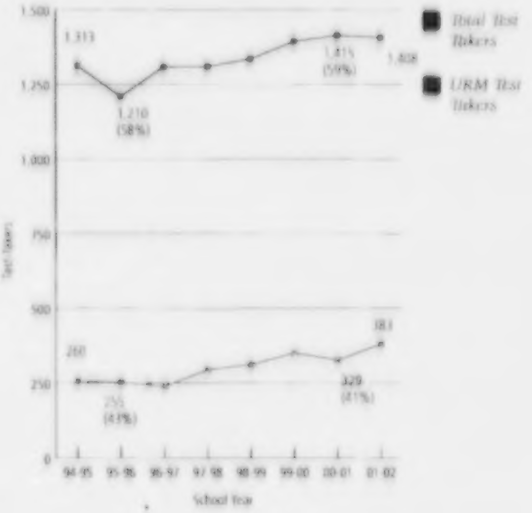
ACT Results

The number of underrepresented minority students (African American/Black, American Indian and/or Alaska Native, Mexican American/Chicano, and Puerto Rican/Hispanic) taking the ACT increased from 260 to 383 from baseline to SY 2001-02 as shown in Figure 2.13.

Figure 2.13

ACT Mathematics Test-taking from SY 1994-95 to 2001-02

	SY	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02
Total G12 Population (A)		m	2,083	2,176	2,339	2,466	2,423	2,394	m
G12 URM Population (B)		m	598	588	651	741	730	795	m
Overall	# of Test Takers (C)	1,313	1,210	1,309	1,310	1,336	1,395	1,415	1,408
	% of Pop (C/A)	m	58%	60%	56%	54%	58%	59%	m
URM	# of Test Takers (D)	260	255	2441	297	314	353	329	383
	% of URM Pop. (D/A)	m	43%	41%	46%	42%	48%	41%	m



Note: URM includes African American/Black, American Indian/Alaska Native, Mexican/Chicano, and Puerto Rican/Hispanic

(%) The percentages of the 12th grade and URM populations respectively

Source: TISC 2002

Mathematics

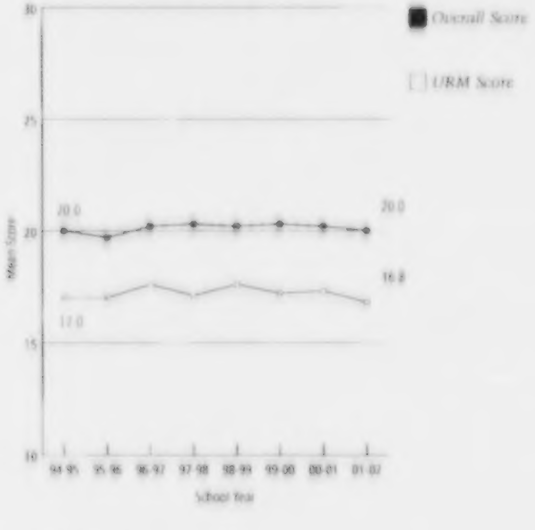
As shown in Figure 2.14, the overall average score was unchanged at 20.0 from baseline to SY 2001-02, with high scores of 20.3 in both SY 1997-98 and SY 1999-00. Underrepresented minority students scored a high of 17.6 in both SY 1996-97 and 1998-99. The scores of African American students, the largest underrepresented minority group, remained stable at 16.6 on the mathematics section of the test from baseline to SY 2001-02, with a high of 17.4 in SY 1998-99.

Figure 2.14

ACT Mathematics Mean Scores from SY 1994-95 to 2001-02

SY	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02
Overall	20.0	19.7	20.2	20.3	20.2	20.3	20.2	20.0
URM	17.0	17.0	17.6	17.1	17.6	17.2	17.3	16.8

Note: URM includes African-American/Black, American Indian/Alaska Native, Mexican/Chicano, and Puerto Rican/Hispanic.



Source: TISC-2002

Science Reasoning

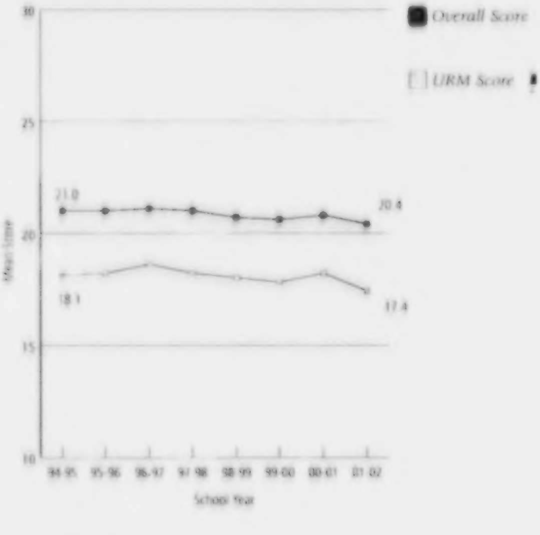
The overall average score was consistent between baseline and SY 2001-02, dipping 0.6 points from 21.0 to 20.4. The mean scores of underrepresented minority students' scores were stable between baseline (18.1) and SY 2000-01 (18.2), with a high point of 18.6 in SY 1996-97. African American students' scores were stable from SY 1994-95 through SY 2000-01 with scores of 17.8 and 17.9 respectively, with a high of 18.4 in SY 1996-97.

Figure 2.15

ACT Science Reasoning Mean Scores from SY 1994-95 to 2001-02

		94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02
Mean Science Scores	Overall	21.0	21.0	21.1	21.0	20.7	20.6	20.8	20.4
	URM	18.1	18.2	18.6	18.2	18.0	17.8	18.2	17.4

Note: URM includes African-American/Black, American Indian/Alaska Native, Mexican/Chicano, and Puerto Rican/Hispanic.



Source: TISC-2002

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CONCLUSION

Banneker Partnership was implemented in OPS to address enrollment disparities and achievement gaps that existed between White students and underrepresented minority students. Banneker Partnership funds and influence have been credited with being the driving force behind a number of reforms and programs that have sought to increase the enrollment, achievement, and preparation for postsecondary studies in mathematics and science of African-American students. These reforms and programs came students' achievement data that indicated some promising changes were occurring.

In the realm of curricular reform, Banneker Partnership's goals were aimed at correcting practices in areas that were having a disproportionately negative impact on African-American students. Corresponding reform came in the form of eliminating the informal "tracking" that was reportedly occurring. Several administrators cited Banneker Partnership as a major influence in the implementation of rigorous curriculum standards for all students and the elimination of several low-level science and mathematics courses.

OPS teachers also linked Banneker Partnership's work to improvements in the culture behind professional development in the district by encouraging teachers to document and share "best practices." Banneker Partnership funds also had a direct impact on professional development efforts, as funds were used to sponsor different professional development activities for mathematics and science teachers. By SY 2000-01, 44% of elementary school teachers, 93% of middle school teachers, and 96% of high school teachers participated in documented professional development directly related to Banneker Partnership goals.

Acquiring support from parents, institutions of higher education, business and industry, and other segments of the community for the OPS's mathematics and science reform objectives was a major part of the overall strategy. OPS made some important strides in this area; the ultimate product of these partnerships has been a greater capacity to provide academic services to students and professional development to teachers. Successful partnerships were formed during the CPMSA time period with the University of Nebraska of Omaha (UNO) (part of the CERTL project), Girls Inc. and the Zion Baptist Church. Banneker Partnership's work to engage parents in their student's mathematics and science coursework was also very successful and was highlighted by the high parental response rate (30%) to Banneker Partnership's School/Parent Agreement.

African American student achievement data indicate some positive trends, but also illustrate that more work needs to be done. Most of Banneker's formal quantitative goals were not met; however, there were a number of marked improvements across a number of different indicators. For example, from SY 1997-98 to 2001-02 Black students' mean scores improved by 25 points (6%) from 420 to 445 on the mathematics section of the SAT, while the mean score of Hispanic students improved 104 points (26%) from 397 to 501. In addition, standardized test results from elementary school yielded positive results, as there was an increase in the number of 4th graders who achieved the 50th percentile or higher on the composite mathematics score of the California Achievement Test (247 to 568).

Although a number of enrollment and completion goals outlined in the cooperative agreement were not met, there were some positive trends. For example, the percentage of underrepresented minority students enrolled in CPMSA schools successfully completing Algebra I (grade "C" or above) in 8th grade increased from 59 (7% of the total 8th grade population) in the baseline year to 156 (11%) by SY 1999-00. Positive trends were also seen in science, as the number of underrepresented minority graduates who were SEM proficient (i.e., students who successfully completed physics, biology, and chemistry) increased during the CPMSA grant period. In SY 1995-96, 53 or 11% of Omaha Public Schools' underrepresented minority graduates from participating CPMSA schools were SEM proficient; by SY 1999-00, that number increased to 100, or 16% of the total number of underrepresented minority graduates.

Banneker Partnership had a major impact on the awareness and concern that OPS policy decisions have with respect to the question of 'equity' for students in their mathematics and science experience and has set the foundation for future reform efforts. OPS continued with its systemic reform efforts in SY 2000-01 with an Urban Systemic Program (USP). SY 2003-04 marked the third year of implementation with their USP, *Community of Excellence in Mathematics and Science* (CEMS).

Section III

COMPREHENSIVE PARTNERSHIPS FOR MATHEMATICS AND SCIENCE ACHIEVEMENT – JACKSON PUBLIC SCHOOL DISTRICT

JACKSON PUBLIC SCHOOLS (JPS) is the largest district in Mississippi, comprised of 56 schools with over 900 teachers teaching mathematics and science and 31,000 students. The majority of students are African American (94%), with Whites, Asian/Pacific Islanders, Hispanics, and American Indians/Alaskan Natives making up the remaining 6% of the student population.

The city of Jackson, founded in 1821, has one of the fastest growing populations in the Sunbelt, with an estimated population of 428,000 in 2001. Many residents of Jackson, including JPS students, are facing economic hardship; 76.4% of JPS students qualified for Free/ Reduced Price Lunch programs in SY 1999-00 (TISC-2001).

According to JPS, their CPMSA efforts were based on the National Science Foundation's six drivers of systemic reform (see table on page 44). These drivers, four process and two outcome, were used to evaluate the development and implementation of programs and activities that are at the heart of the CPMSA program. In following these drivers, JPS pledged to:

- Align all science and mathematics curricula to national standards (Driver 1).
- Develop a set of policies that support mathematics and science reform (Driver 2).
- Converge resources and external funding (Driver 3).
- Increase partnerships and maximize resources (Driver 4).
- Gather evidence that the program is enhancing student achievement (Driver 5).
- Improve the achievement of all students (Driver 6).

In 1996, JPS was awarded a five-year, $3.4 million CPMSA grant.

A Profile of Jackson, Mississippi

Jackson, located in central Mississippi, is the state's largest city with a population of approximately 184,256 (U.S. Census Bureau, 2000).

Approximately 70.6% of the population is Black. Whites are the second most populous ethnic group at approximately 27.8% of the population. All other ethnic groups combined constituted approximately 1.6% of the population (U.S. Census Bureau, 2000).

Jackson's median household income is $30,414, with the per capita at $17,116 (U.S. Census Bureau, 2000), and its unemployment rate is approximately 3.6% (U.S. Department of Labor).

Jackson is home to several institutions of higher learning, including Belhaven College, Jackson State University, Millsaps College, and Jackson State University, and the nationally renowned University of Mississippi Medical Center.

■ ***Jackson, MS***

Sources: U.S. Census Bureau 2000 and 2001
U.S. Department of Labor

Jackson Public Schools Facts in Brief (SY 2000-01)

Total Students: 31,235
American Indian: 0.1%
Asian/Pacific Islander: 0.3%
Black (Not Hispanic): 94.0%
Hispanic: 0.2%
White (Not Hispanic): 5.5%

Male: 50% Female: 50%

Students Enrolled in:
Elementary Schools: 49%
Middle Schools: 22%
High Schools: 24%
Ungraded Schools: 5%

Schools: Total 56
Elementary Schools: 37
Middle Schools: 11
High Schools: 8

Mathematics and Science Teachers: Total 926
Elementary Teachers: 680
Middle School Mathematics Teachers: 64
High School Mathematics Teachers: 58
Middle School Science Teachers: 64
High School Science Teachers: 60

Selected Key Indicators
Special Education: 9.4%
Limited English Proficient Students:*1 0.2%
Free and Reduced Lunch Students:*1 76.4%
Daily Average Attendance: 93.4%
Average Retained: 14.7%
Drop-out Rate: 3.2%
Mobility: 22.1%
Per Pupil Cost:*1 $6,463
Number of Students per Computer*1 9
Classrooms with Internet Access*1 10%
Average Class Size*1 15.4

Notes: *1 Data is from SY 1999-2000

Sources:
- *Tabulated Indicators for Systemic Change (TISC 2002)*, Systemic Research, Inc.
- Core Data Elements, 2001, Westat, Inc.

NSF's Systemic Reform Drivers

Driver	Description
1	Implementation of a comprehensive, standards-based curriculum and/or instructional materials that are aligned with instruction and assessment available to every student served by the system and its partners.
2	Development of a coherent, consistent set of policies that supports provisions of broad-based reform of mathematics and science at the K-12 level.
3	Convergence of all resources that are designed for or that reasonably could be used to support science and mathematics education-fiscal, intellectual, materials-both in formal and informal education settings-into a focused program that upgrades and continually improves the educational program in science and mathematics for all students.
4	Broad-based support from parents, policymakers, institutions of higher education, business and industry, foundations, and other segments of the community for the goals and collective value of the program that is based on an understanding of the ideas behind the program and knowledge of its strengths and weaknesses.
5	Accumulation of broad and deep array of evidence that the program is enhancing student achievement through a set of indices. In the specific instance of student achievements test scores, awardees on an annual basis, are expected to report the results of student mathematics and science achievements in a multi-grade level context for the SI impacted schools/districts/state(s) relative to appropriate cohort entities (non-SI districts, the state), all of which are defined by the performance baseline.
6	Improvement in the achievement of all students, including those historically underserved, as evidenced by progressive increments in student performance characterized by the requisite specificity of the SI as a catalytic resource and the appropriateness of attendant attributions.

Source: *http://www.ehr.nsf.gov/esr/drivers*

GOALS FROM COOPERATIVE AGREEMENT

As a requirement of the CPMSA grant, JPS signed a cooperative agreement with NSF outlining fiscal and administrative requirements for implementation. Table 3.1 outlines the list of detailed objectives in the 1996 cooperative agreement.

Also outlined in the cooperative agreement were student achievement goals, as shown in Table 3.2.

Table 3.1

Program Objectives

Areas of Reform	Statement of Work from Cooperative Agreement
Curriculum, Instruction and Assessment	• The CPMSA project agrees to develop strategies that will substantially increase enrollment and successful completion of "gate-keeping" courses. • The district's science and mathematics curricula shall be aligned with national standards by 1998-99.
Policy	• All middle and high school science labs shall be upgraded annually in order to meet or exceed state accreditation standards by school year 1998-99. • All students (approximately 2,500) entering the ninth grade in 1997-98 shall be required to earn four Carnegie units each of science and mathematics for graduation in year 2001. • Balanced emphasis shall be placed on all phases of the K-12 academic pipeline with major emphasis on science and mathematics enrichment.
Partnerships/ Convergence of Resources	• Special efforts shall be made to include industrial partners, as well as organizations serving under-represented groups outside of formal educational structures as appropriate in the CPMSA's activities. • The CPMSA shall function in a complementary way with the State Systemic Initiative (SSI), the Urban Systemic Initiative (USI), and Rural Systemic Initiative (RSI) programs.
Student Support	• Access to study groups, tutoring, and other support services shall be provided for middle school students. Participation shall increase at a rate of 20% per year for each of the five years of this award period.
Professional Development	• Participant support for students, teachers, counselors, and parents in the CPMSA project should be limited to those students, teachers, counselors, and parents from the Jackson Public Schools. • The Centers of Excellence for Research Teaching and Learning (CERTL) Program shall provide research experiences for secondary teachers and students.

Table 3.2

Student Achievement Goals

Areas of Reform in Student Achievement	Goals
Mathematics	• The percentage of 7th grade students in the Jackson Public Schools who successfully complete [grade "C" or better] Pre-Algebra shall increase from 4.8% to 80% of the total 7th graders. • The percentage of 8th grade students in the Jackson Public Schools who successfully complete Algebra I shall increase from 18.8% to 80% of the total 8th graders. • The percentage of 9th grade students in the Jackson Public Schools who successfully complete Algebra I shall increase from 24.8% to 100% of the total 9th graders. • The percentage of 10th grade students enrolled in Geometry shall increase from 25.7% to 80% of the total 10th graders. • The percentage of graduates who successfully completed Trigonometry/Pre-Calculus shall double from 37.2% to 74.4% of the total high school graduates over the five-year period of this award. • The percentage of graduates who successfully complete AP Calculus shall increase from 3.4% to 40% of the total high school graduates over the five-year period of this award. • The average score of JPS students on the State Algebra I subject area test shall increase to the state average or above by the end of the grant award. The mean scaled scores will increase an average of 2 points per year. • The number of schools scoring at the National Average (50th percentile) on Total Mathematics on the Iowa Test of Basic Skills by grade level shall increase over the five-year period of this award.
Science	• The percentage of first year 9th grade students enrolled in Biology shall increase from 48.4% to 90% of the total 9th graders. • The percentage of graduates who successfully complete Advanced Biology shall double from 24.1% to 48.2% of the total high school graduates over the five-year period of this award. • The percentage of graduates who successfully complete Chemistry shall increase from 46.3% to 80% of the total high school graduates over the five-year period of this award. • The percentage of graduates who successfully complete Physics shall increase from 13% to 39% of the total high school graduates over the five-year period of this award.
Overall	• The dropout rate of the Jackson Public Schools shall be reduced by 5%, 10%, 15%, 20%, and 25% in school years 1996-97, 1997-98, 1998-99, 1999-00, and 2000-01, respectively. • The Average Daily Attendance rate of JPS shall increase from 91.4% to 94.4%, an average increase of 0.6% each year over the five-year period of this award. • The average ACT composite score of JPS students shall increase from 17.4 to 20.4 over the five-year period of this award.

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IMPLEMENTATION STRATEGIES

The five-year CPMSA grant was implemented across all schools in JPS beginning in SY 1996-97. Superintendent Dr. Jayne Sargent served as the Principal Investigator (PI), Deputy Superintendent Ron Sellars was the Co-PI, and the Project Director (PD) and Co-PD were Martha Roberts and Dee Chambliss, respectively.

Instructional site teams were installed at JPS middle and high schools during SY 1998-99. These teams, comprised of a mathematics teacher, a science teacher, a language arts teacher, a social studies teacher, a building administrator, and a school counselor, were responsible for developing and monitoring the implementation of a two to five year plan for the improvement of mathematics and science curriculum and instruction in their respective schools.

The district was organized into K-12 feeder patterns in SY 1999-00 to encourage more data-driven decisions and to strengthen site council management, professional development, and parental involvement. Every school in the district had a site council, which was comprised of teachers, administrators, parents, and other support members who assessed student achievement and planned for continuous improvement.

CURRICULUM, INSTRUCTION AND ASSESSMENT

Curriculum, instruction, and assessment reform in JPS was centered on ensuring the comprehensive implementation of standards-based practices. In keeping with this goal was the overarching objective of raising academic standards.

Before CPMSA activities began in Jackson, science and mathematics standards-based curricula were not being systemically implemented across the district's schools. A similar trend was evident in regards to standards-based instruction and student assessment. For example, assessment practices were not fully aligned with the adopted mathematics and science curriculum.

From its inception, the JPS CPMSA project sought to enact policies to address the lack of standards-based practices in the district. Since CPMSA began in Jackson a number of successful policies and practices have been implemented that have allowed JPS to better adhere to standards-based practices and raise academic standards. These policies and practices will be discussed in the following sections.

Curricular Reform

Ensuring the implementation of a standards-based mathematics and science curriculum across the district was a central element of JPS reform efforts. According to data collected in TISC-2000, in SY 1995-96 only 10% of all elementary, middle, and high schools had adopted or were implementing a standards-based curriculum. In addition to the lack of implementation, curricula frameworks were not aligned to national standards.

Beginning in SY 1998-99, Mississippi began to revise its entire science and mathematics framework to be aligned with national standards. The Mississippi Department of Education (MDE) science framework reflected the standards developed by the National Science Research Council. This science framework was rewritten in SY 1999-00 by the MDE, and underwent continued revisions through Spring 2002. Science standards were now linked to standards set by the National Science Teachers Association (NSTA) and the American Association for the Advancement of Science (AAAS). State standards in mathematics were aligned to the National Council of Teachers of Mathematics (NCTM) standards.

At the inception of CPMSA, JPS aligned district curriculum to national science and mathematics standards. In order to guarantee standards-based mathematics and science curricular materials were chosen, in SY 1997-98 a district committee made up of exemplary teachers was created to review potential mathematics and science textbooks and then make selections to ensure proper implementation. JPS science and mathematics curriculum standards were again revised in SY 2000-01 and were based on the new curriculum frameworks created by the MDE.

Putting the curriculum framework in place was not the only challenge for JPS; keeping the district's classrooms on pace with the evolving state curriculum standards was another. Efforts to implement a standards-based curriculum proved to be difficult as teachers who attempted to address the wide range of abilities in the student body often fell behind on the curriculum. One school principal speaking of the challenge teachers faced noted, "they would be teaching number concepts for most of the semester and would never get to fractions because it was at the end of the book." JPS responded to this challenge during SY 1999-00 by designing and distributing mathematics and science "pacing" guides. These guides were created with the objective of organizing the teaching of different skills and objectives while also providing a timeline, recommended instructional strategies and practices, and sample assessment items. Each pacing guide was divided into core competencies, and then further subdivided into multiple objectives, suggested instructional strategies, sample items for informal assessment, and a curriculum resource list from standards-based resources. In order to increase the accessibility of these guides, all district "pacing" guides were placed on the JPS curriculum website. Table 3.3 illustrates some examples from the district pacing guides for Algebra I and Biology II.

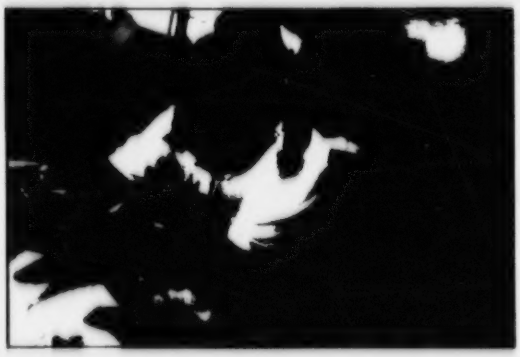


Table 3.3

Mathematics and Science Pacing Guide Examples

<table>
<tr><th colspan="3">Subject: Algebra I</th></tr>
<tr><td colspan="3">Example Competency: Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.</td></tr>
<tr><th>Example Objective</th><th>Instructional Strategy</th><th>Sample Assessment Items</th></tr>
<tr><td>Solve, check, and graph linear equations and inequalities in one variable, including rational coefficients.
Be sure to address the following: 1) Distinguish between symbols for inequalities and equations. 2) Develop a linear graph using graphing calculator</td><td>• Use manipulatives (e.g., algebra tiles, algeblocks) to model the process solving linear equations in one variable.
• Have students use a flow chart to demonstrate the steps to solving equation in one variable.
• Provide students with an index card containing an equation that is worked out and solved INCORRECTLY. Students should determine the mistake and solve the equation correctly. Continue passing the cards until everyone has had an opportunity to solve equation.</td><td>• Simone needs to earn at least $345 to buy a used saxophone. If she earns $20 each time she works at the hospital, what is the minimum number of times she must work at the hospital in order to be able to buy the saxophone?
• The width of a piece of wood ranges from 89 mm to 98mm. Write and graph an inequality to describe this interval.
• Explain the difference between discrete and continuous graphs on a number line. Include drawings in your explanation.</td></tr>
<tr><th colspan="3">Subject: Biology II</th></tr>
<tr><td colspan="3">Example Competency: Investigate chemical processes of the cell that maintain life.</td></tr>
<tr><th>Example Objective</th><th>Instructional Strategy</th><th>Sample Assessment Items</th></tr>
<tr><td>Analyze light dependent and light independent reactions of photosynthesis with respect to site, reactions involved and energy input/output.</td><td>• Lab Activity - "Measuring Photosynthetic Rate in Spinach Leaf Disks" (Prentice Hall)
• Lab Activity – Design an original experiment to investigate some factor that affects the production of oxygen in photosynthesis.
• TI – 83 Plus Activity Please Re-Leaf Me – In this activity, the students will examine data about carbon dioxide levels, graph the data, make predictions about carbon dioxide in other circumstances and sketch graphs based on their predictions.</td><td>• How many molecules of glucose are produced by each cycle of the light reaction?
a. two
b. four
c. zero
d. three
• Construct a graph showing the results of lab activity in 2C.
• In photosynthesis, what is the immediate source of energy used to produce a proton gradient?
a. NADP+
b. light
c. a series of redox reactions
d. ATP</td></tr>
</table>

Note: All pacing guides were organized by term and also provided curriculum sources.

Progress was made in the implementation of the standards-based curriculum. Data in TISC 2002 indicate that by SY 1999-00, 100% of elementary, middle, and high schools had adopted a standards-based mathematics and science curriculum.

Administrators and teachers were also concerned that the level and rigor of the district's mathematics and science curriculum was not adequately preparing students for college preparatory classes. Prior to the CPMSA initiative, remedial courses in science and mathematics fulfilled graduation requirements, science was rarely taught in elementary school, and the K-5 mathematics curriculum was not sufficient. In addition to eliminating remedial courses, between SY 1996-97 and SY 1999-00, JPS introduced several upper level mathematics and science courses including the following:

- Biomedical research courses
- Field studies in science
- Microbiology
- Molecular Biology
- Health related professions courses.

Standards-Based Instruction

According to JPS annual reports, professional development in standards-based training was virtually nonexistent prior to CPMSA grant implementation. Substantial progress was made in basing instructional practices on the adopted standards-based mathematics and science curriculum.

Training sessions and workshops in standards-based instructional practices have been implemented through a number of different programs throughout JPS. One model of standards-based training undertaken was the *Algebra Project*. The *Algebra Project* is a national mathematics literacy effort aimed at enabling low income students and students of color to achieve greater mathematical skills. *Algebra Project* teacher training provided standards-based professional development for middle school teachers during a two-week summer institute. Afterwards, teachers were supported by monthly classroom visits and Saturday workshops. The *Algebra Project* has been instrumental in providing standards-based professional development for elementary, middle and high school math teachers. Forty-one teachers received over 80 hours of training in mathematics content and innovative strategies that promote student achievement. These teachers were supported through classroom visitation and observations, in addition to receiving over 24 hours of follow-up training. The workshops addressed such issues as the language of mathematics, grouping students for greater achievement, and dispelling myths about teaching and learning mathematics.

Along with adopting and implementing standards-based practices, instructional reform efforts also sought to introduce more "hands on, inquiry based" curriculum and teaching strategies. Mississippi and national standards dictate that students should participate in these types of innovative science and mathematics activities. In alignment with these standards, the JPS CPMSA grant supported a number of programs that were aimed at improving the implementation of hands-on, inquiry-based instruction. One such example was the aforementioned *Algebra Project*. Another example was the SECME program, (Science, Engineering, Communication, Mathematics Enhancement) aimed at providing standards-based enrichment activities and promoting critical thinking. The SECME program was introduced in SY 1998-1999 in order to increase the pool of historically under-represented, under-served, students who will be prepared to enter and complete college courses in science, mathematics, engineering, and technology. SECME supported students interested in SMET careers by providing standards-based enrichment activities and promoting critical thinking through different hands-on learning experiences.

Assessment

JPS recognized the central role assessment must play in the area of student achievement. During the five years of the CPMSA grant, new policies were developed and existing policies were strengthened in a number of different areas to improve assessment practices. The principle objective of assessment reform was the alignment of assessment tools to mathematics and science curriculum implemented between SYs 1997-98 and 2000-01. According to data reported in TISC 2000, JPS successfully achieved this objective.

From SY 1996-97 through SY 1999-00, a variety of mathematics assessment tests were administered. Students in grades three through eight were given the Terra Nova Assessment. All Algebra I and Biology I students took district criterion referenced nine-week and semester exams that were aligned with the curriculum. In order to receive a high school diploma, students were required to pass the Functional Literacy Exam (FLE).

By the conclusion of CPMSA funding, teachers and district support personnel had developed a standards-based planning matrix that incorporated assessment testing data into the framework from which curriculum and instruction decisions were made. As an example, data reports based on assessment results were generated to indicate the specific strengths and weaknesses of each instructional standard. Teachers were then able to use the data to modify their instructional practices and curriculum.

Table 3.4 lists the assessment tools in use throughout JPS (NSF Annual Report, JPS District, 1999-00).

Table 3.4

JPS Assessment Tools (SY 1999-00)

Mathematics	
Grades 3 & 6	• District term (criterion referenced) testing based on the pacing guides • District imposed exit test (determines grade promotion)
Grades 2-8	• Grade Level Testing program • Criterion referenced testing with writing assessment at grades 4-7
Grades 3-8	• Norm referenced testing (Terra Nova)
Grades 4 & 7	• State criterion-reference tests (Based on State Frameworks) • Benchmark grades (may determine promotion)
Algebra I	• District Term Testing • Criterion Testing (based on State Frameworks) • MS Subject Area Testing Program • Graduation requirement for current 6th graders
Functional Literacy Exam (FLE)	• Measures minimum proficiency for graduation (required for graduation until 2005)
Science	
Grade 4-Science **Grade 7-Science**	• Currently being researched and planned for implementation in 01-02 school year. • District Term Testing • MS State Testing Program (graduation requirement for current 6th graders)
Biology I	• District Term Testing • MS State Testing Program (graduation requirement for current 6th graders)
ACT	• Science Reasoning

STUDENT SUPPORT/ENRICHMENT PROGRAMS

Supporting the CPMSA goals in science was JPS' **Environmental Learning Center**, which opened in the summer of 1992. The overarching goal was to introduce each student to their environment and explain how the environment helps them, and how they may in turn help the environment. As of SY 2001-02 it was staffed by three retired principals from JPS. The Center encompasses 640 acres, including a 35-acre lake, 14 miles of nature trails, three outdoor classrooms, a catfish pond, ropes course, and a cemetery, among other naturally interactive features. Over 20 programs are offered on subjects ranging from the study of marine life, to soil erosion, to the symbiotic relationship between bees and humans. The Center's focus on introducing students to the environment is a central component to broadening the horizons of JPS students.

Other programs that support CPMSA goals are *Roots and Wings* and *Co-NECT Schools*, both implemented in SY 1998-99. *Roots and Wings* is centered on one promise: every child will progress successfully through the elementary grades, regardless of what is necessary. By ensuring a firm foundation in the skills needed to succeed in today's world, JPS students will be prepared to make a definite mark in the future. The "Roots" aspect of the program uses extensive training support and one-on-one tutoring to establish a firm base for students to learn problem-solving skills. "Wings" revolves around curriculum and instruction improvements designed to let children soar. Part of this is *WorldLab*, a science/social studies program, which creates investigations and simulations to build and hone skills in creative, integrated, and flexible ways to solve problems.

Co-NECT Schools is designed to assist K-12 educators use technology for comprehensive change and improved academics with emphasis upon learning by doing, organization into small learning communities, high expectations and school-wide accountability, and sensible use of the best technology available. At the high school level the program focuses on areas that will help prepare students for post-graduation life, whether that centers on specialized academic areas, apprenticeships, or a combination of the two.

Modern Red Schoolhouse (MRSH) is another program that was implemented in SY 1998-99, affecting 862 JPS students the first year. It takes community support and expectations for achievement from the old-fashioned little red schoolhouse and combines them with today's informational and technological resources while displaying tracking of student progress and constant monitoring of the curriculum. MRSH is designed to assist students in establishing a foundation in numerous academic subjects including English, geography, history, mathematics, and science while fusing new innovative teaching methods with traditional curricula to ensure that all students learn. The only goal acceptable to MRSH is mastery of the subject matter, which in turn awakens students to their true potential.

Project SEED, a CPMSA supported non-profit national mathematics program implemented in SY 1996-97, shows elementary school students the pleasure and enjoyment of learning advanced conceptual mathematics. Using a unique Socratic group discovery teaching methodology, Project SEED allows entire classes to explore their individual abilities and succeed in difficult, high-level courses. The SEED program provided over 40 hours of professional development to more than 400 elementary school teachers, with two additional sessions during the school year as a supplement to the initial training.

POLICY

Due to the influence of CPMSA, JPS improved its policy formation and implementation process by shifting to a more data driven system. An illustration of this shift was manifested in the district's use of student assessment data to guide curriculum policy decisions. Prior to CPMSA, there was no formal process to link student assessment test data to curriculum and instruction practices. From SY 1997-98 to 2000-01, changes were made so that a formal review process was in place, enabling teachers, administrators, and parents to examine student achievement data prior to making policy decisions regarding curriculum.

According to annual reports, policy changes in the areas of district organization and curriculum and assessment had the largest positive impact. Major organizational reform took place in SY 1999-00; seven feeder patterns were created at the school level to improve communication among the schools in the same geographic area of Jackson. Each feeder system consists of an elementary and middle school that feed into one or two high schools. An Executive Principal was appointed and was responsible for overseeing the entire system. Administrators have reported that this change has led to greater vertical alignment of curriculum and instructional practices throughout various grade levels.

Steps were taken to raise the level of science and mathematics education. A number of different policies aimed at increasing academic standards were implemented. In SY 1999-00, science graduation requirements increased from two to three years. All incoming freshmen must successfully complete three of the following courses, one of which must be Biology:

- Biology or Biology Accelerated
- Biology Advanced
- Human Anatomy
- Chemistry Accelerated
- AP Chemistry
- Physical Science
- Physics
- AP Physics
- AP Biology

Ninth grade students must also pass the Mississippi Subject Area Test in Biology beginning in 2001-02.

The practice of social promotion ended and the district imposed mathematics and science grade requirements for grade promotion; students in grades K-5 must pass mathematics with a grade of 70 or above and students in grades 4 and 5 must pass science with a grade of 70 or above.

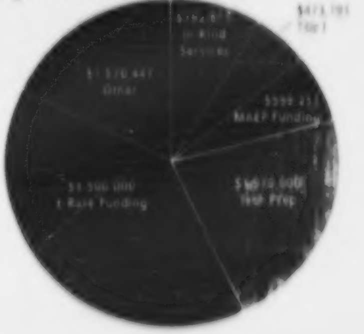
Policies were also developed to facilitate the entry of students into more advanced mathematics and science coursework. JPS had instituted a policy that mandated that all students complete Algebra I by the end of eighth grade. In support of this requirement, policies were amended so that the district's sixth graders had the opportunity to enroll in Pre-Algebra and all seventh graders were allowed to take the Transitional Algebra courses. Middle school mathematics teachers received professional development during the summer of 2000 to promote this initiative.

CONVERGENCE OF RESOURCES

A key to the success of Jackson's CPMSA reform efforts was the ability to converge resources and maximize the number of JPS students who were impacted by CPMSA supported programs and activities. Figure 3.1 details the dollar figures associated with some of these other sources of additional funding.

Figure 3.1

Convergence of Resources Summary



Source: 1999-00 NSF Annual Report

E-Rate, a program allowing eligible schools and libraries to install Internet connections and telecommunications services at a discounted rate, provided the largest amount of funding, at $3.5 million.

The **Tech Prep** program was another large source of funding ($1.97 million). This program begins in 11th grade and continues through (at least) the first two years of study at a postsecondary institution. Students enroll in technical classes in a selected career field and may receive college credits for courses taken at the high school level.

Other major providers include In-kind services, MAEP funding, and Title I (see table 3.5).

Table 3.5

Major Providers of Resources

Resources	
E-Rate	Supports the connections of all district schools to the Internet
Tech Prep	Supports the implementation and maintenance of the Tech Prep programs
In-Kind Services	Time spent by district personnel planning and supporting mathematics and science reform beyond the NSF-supported time; mathematics and science support of school models Co-NECT and Modern Red Schoolhouse; technology support
MAEP Funding	Funds to support the construction and upgrade of 16 high school science labs
Title I	Professional development to support whole school reform; personnel to provide student support services for mathematics; computers to support Math and Science Teachers in the Power to Teach Initiative

PARTNERSHIPS

Partnerships within the community have played an important role in advancing JPS reform efforts. The majority of partnership support for JPS has been from institutions of higher learning, as well as business and industry, and the surrounding community.

Jackson State University

Working as a consortium partner and subcontractor, Jackson State University (JSU) helped support the goals and objectives of the CPMSA project by serving as a Center of Excellence for Research, Teaching, and Learning (CERTL) beginning in SY 1997-98. The focus of JSU's support was on providing supplementary teacher enhancement and student enrichment activities. CERTL's goal of strengthening the CPMSA project was accomplished by improving training of science and mathematics teachers, making the science curriculum most effective for learning, and by providing student laboratory experience that enhances learning and interest.

In a SY 1999-00 CERTL summer training session that included 36 elementary, middle, and high school teachers, three main topics were addressed through hands-on, minds-on laboratory and problem-solving activities: increasing the amount of time spent on science, providing training needed to create effective science classrooms, and offering practicums for utilization of training involving elementary summer camp participants.

Parallel to the above mentioned training session was a science and mathematics summer day camp for elementary and middle school students. Twenty-six elementary school students attended a one-week program, and groups of sixty-three and sixty-nine middle school students each attended a two-week session. The program's curriculum, which modeled the summer training sessions, was comprised of the following main themes:

- Recruitment – early identification of students for the program
- Orientation – affecting student and parental understanding of the school environment
- Academic support – including tutoring and study groups
- Enrichment – increasing and developing student interest in science
- Course selection advisory – ensuring inclusion in the science/mathematics college pipeline
- Academic recognition – encouraging leadership and academic performance

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Mathematics, Physical Sciences, Life Sciences/Earth Sciences, Computer Applications, and Communications Skills instructors for the camp were provided by JSU.

JSU is also working with JPS to offer a variety of other programs and experiences such as science clubs, a school speakers program, national student competitions (Science Olympiad, MathCounts, etc.), tutoring, internships, minority role models, and an array of research opportunities.

Mississippi College

Mississippi College provides content-based professional development to elementary school science teachers to support Project SEED. These teachers are taught leadership skills and how to develop more of a focus on inquiry based methods of classroom participation. The program also offers summer workshops at which teacher leaders assist.

University Medical Center – Base Pair Program

Base Pair joins University Medical Center (UMC) faculty with high school students and educators in a biomedical research-mentoring program. While originally intended solely for JPS, Base Pair's success has caused the program to expand to several other districts in central Mississippi while continuing to focus on giving each student a hands-on experience in various scientific fields.

As part of the program, an additional high school course, Biomedical Research, was created in order to prepare students for laboratory work at UMC. For the course, mentors spend their afternoons assisting students with active laboratory research. Two hundred fifty-six JPS students have participated in this project. Professional development and science curriculum enhancement workshops also help to create a highly coordinated drive toward the discussion of biomedical science issues.

Student Success Story

Giovanni Adams, a senior at Murrah High School in SY 2000-01, stated, "Murrah is a great environment to grow in – teachers don't just teach science, they teach life!" Murrah offers its students opportunities above and beyond those of ordinary schools. Giovanni took advantage of one of these opportunities, participating in a biomedical mentorship program called "Base Pair," which pairs students with researchers at the University of Mississippi Medical Center on various research projects. He also traveled to the National Institute of Health in Maryland for a summer cancer research internship in 2000.

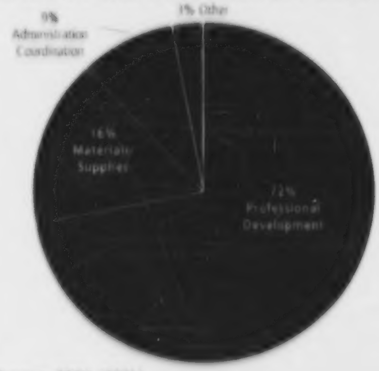
Giovanni hopes to pursue a career in cancer research or possibly brain surgery. He placed 4th in the Medicine and Health Division at the Year 2000 Intel International Science and Engineering Fair in Detroit as well as the Army's Operation Cherry Blossom Award, which earned him cash prizes in addition to an all-expense paid trip to Japan.

PROFESSIONAL DEVELOPMENT AND LEAD TEACHERS

CPMSA allocated over 70% of its funds towards mathematics and science professional development (see Figure 3.2).

Figure 3.2

CPMSA Fund Utilization (SY 2000-01)



Source: TISC (2001)

CPMSA efforts were focused on improving the accessibility and quality of professional development sessions offered to teachers. All new professional development activities were data driven; before professional development activities were supported they needed to be tied to "data-documented" needs from student achievement tests and teacher surveys.

Policies were amended to provide greater accessibility to teachers seeking to participate in professional development activities. Two professional development days per year have been designated district professional development days and are used specifically for science/mathematics training.

A focal point of CPMSA efforts was establishing the position of Elementary Instructional Specialists. Each specialist provided site-based support for all elementary teachers in JPS and was assigned to one particular feeder pattern. Specialists supported teachers through instructional modeling, teacher observation, and need-specific workshops.

A number of efforts were also undertaken to improve the quality and accessibility of mathematics/science professional development. CPMSA supported activities included the creation of distance learning sites, and the establishment of teacher leader groups.

As shown in Table 3.6, success was achieved in reaching a large proportion of teachers in the district, as close to 100% of all mathematics/science teachers participated in some mathematics/science professional development activity.

Table 3.6

Percentage of Teachers Receiving Professional Development

School Level	Total Number of Teachers	Receiving Mathematics/Science Professional Development	Percentage Teachers Teaching Mathematics/Science
K-G5	710	680	95.8%
Math 6-8	79	79	100%
Math 9-12	73	73	100%
Total	862	832	97%
Science 6-8	68	68	100%
Science 9-12	72	72	100%
Total	140	140	

Most importantly, JPS developed an infrastructure to maintain consistent professional development efforts to support the district's large number of teachers. Annual reports cite five major components to the successful development of the infrastructure for sustained professional development: (1) the creation of feeder patterns (2) support from instructional specialists (3) teacher leaders (4) partnerships with institution of higher education and (5) utilization of distance learning labs. Table 3.7 outlines the details of the infrastructure.

Table 3.7

Professional Development Infrastructure

Component	Contribution to Professional Development
Creation of Feeder Patterns	The creation of feeder patterns allowed each school to customize professional development program to meet the specific needs of the teachers in the feeder pattern.
Instructional Specialists	Instructional Specialists hired by the district support elementary and middle school teachers in daily classroom-level activities such as planning lessons, modeling exemplary instruction, developing assessment tools, and implementing standards based curricula. Specialists also monitor teacher-student interactions, and provide feedback and follow-up support.
Teacher Leaders	Thirty-two K-8 teacher leaders, directly supported by CPMSA, were trained during SY 1999-00 to support other teachers in their buildings. These teacher leaders received training in content and pedagogy, classroom observations, and curriculum evaluation.
Partnerships with Institutions of Higher Education	• Jackson State University, previously a CERTL partner, has worked with the district to extend this program beyond the CERTL agreement and provide specialized programs of study for teachers in mathematics and science content. • Mississippi College has partnered with JPS to provide training for the teacher leaders, and to design and offer for credit special courses for our math and science teachers.
Initialization and Utilization of Distance Learning Labs	All middle and high schools have been equipped with distance learning labs. This technology significantly increases the JPS ability to train large numbers of teachers.

LEADERSHIP

JPS relied on leadership from CPMSA staff and JPS administrators to drive systemic reform efforts in the district. Dr. Jayne B. Sargent, Principal Investigator, and Ron Sellers, Co-Principal Investigator, led the CPMSA staff which included Martha Roberts, Project Director, and Dee Chambliss, Co-Project Director.

At the onset of the grant, there was some discontinuity in JPS leadership that negatively impacted the district. The 1996-97 CPMSA annual report linked the past discontinuity in JPS' leadership to earlier issues of low teacher and staff morale. Administrators report in TISC 2001 that from SY 1997-98 to SY 2000-01, JPS began to experience more stable leadership that has led to positive results. "There has been a continuity of leadership for the past four years and there has been extensive support from the Superintendent's office. The Superintendent is active in the Superintendent's Coalition and is a member of its board. There is also considerable support in the movement toward systemic reform for improved student achievement."

STUDENT ACHIEVEMENT

Student achievement goals for the CPMSA grant were based on the cooperative agreement between JPS and NSF, which outlined several mathematics and science achievement goals. The following is a brief summary of the measurable goals that are presented in this section:

- **GOAL A:** Increase the number of 7th graders successfully completing Pre-Algebra
- **GOAL B:** Increase the number of 8th graders successfully completing Algebra I
- **GOAL C:** Increase the number of 9th graders successfully completing Algebra I
- **GOAL M:** Increase in the Average Daily Attendance Rate
- **GOAL N:** Increase in the average ACT composite score

There were also a number of goals that were unable to be measured as defined in the cooperative agreement. As an alternative to those goals, the following achievement data is presented:

- Grade 9-12 enrollment and completion of gate-keeping mathematics and science courses
- College entrance exams results

Successful Completion of Pre-Algebra in 7th Grade

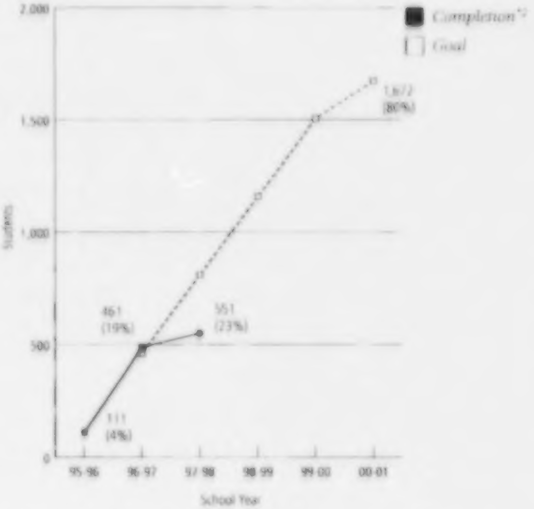
GOAL A: The number and/or percentage of 7th grade students in the Jackson Public Schools who succesfully complete Pre-Algebra shall increase from 123* or 4.8%* to 2,033 or 80% of the total 2,541 7th graders. This is an average increase of 382 students per year over the five-year period of this award.

*Data are reported in TISC-2001 as 111 and 4.4%

Through the first year of the CPMSA program, JPS was on track to reach their goal of 80% completion of Pre-Algebra by 7th graders. In SY 1996-97, 488 7th graders (20% of the total 7th grade population) successfully completed Pre-Algebra. The rate of increase slowed in SY 1997-98 so that 23% of the 7th graders were enrolled; data were unavailable from SY 1998-99 to 2000-01.

Figure 3.3

Pre-Algebra in 7th Grade *1



*1 Annual goals based on an average percentage increase

*2 Successful Completion defined as a grade of "C" or better

( ) % of the total G7 population

SY	95-96	96-97	97-98	98-99	99-00	00-01
Total G7 Population	2,541	2,424	2,383	2,313	2,316	2,090
Enrollment	123	540	651	m	m	m
Completion	111	488	551	m	m	m
% Completion*3	4%	20%	23%	n.a.	n.a.	n.a.
Goal		461	810	1,157	1,505	1,672
Goal %*3		19%	34%	50%	65%	80%

*3 % completion of total G7 population

Successful completion of Algebra I in 8th Grade

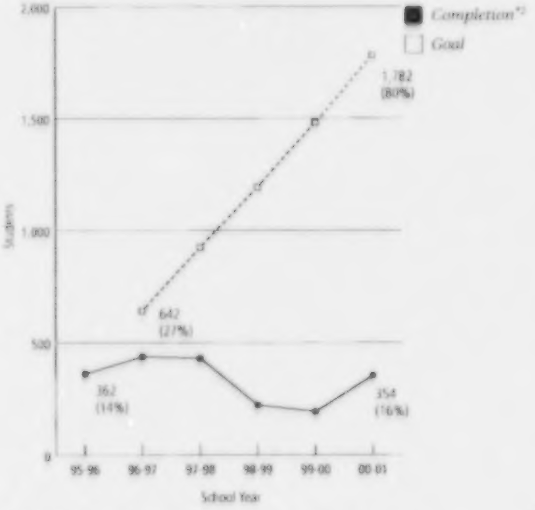
GOAL B: The number and/or percentage of 8th grade students in the Jackson Public Schools who successfully complete Algebra I shall increase from 486* or 18.8%* to 2,064 or 80% of the total (2,579) 8th graders. This is an average increase of 316 students per year over the five-year period of this award.

* Data are reported in TISC-2001 as 362 and 14%

As can be seen in Figure 3.4, JPS was unable to reach their goal of 80% completion of Algebra I by 8th graders. The completion rates remained relatively steady, rising from 14% to 16% of the total 8th grade population over the five years of the CPMSA program. The number of students successfully completing Algebra I in 8th grade decreased from 362 to 354, accompanied by a corresponding decrease in the total 8th grade population from 2,579 to 2,228.

Figure 3.4

Algebra I in 8th Grade[*1]



[*1] Annual goals based on an average percentage increase

[*2] Successful completion defined as a grade of "C" or better

( ) % of the total G8 population

SY	95 96	96 97	97 98	98 99	99-00	00 01
Total G8 Population	2,579	2,377	2,313	2,209	2,211	2,228
Enrollment	486	532	508	337	223	570
Completion	362	439	431	222	194	354
% Completion[*3]	14%	18%	19%	10%	9%	16%
Goal		642	925	1,193	1,481	1,782
Goal %[*3]		27%	40%	54%	67%	80%

[*3] % Completion of total G8 population

Successful completion of Algebra I in 9th Grade

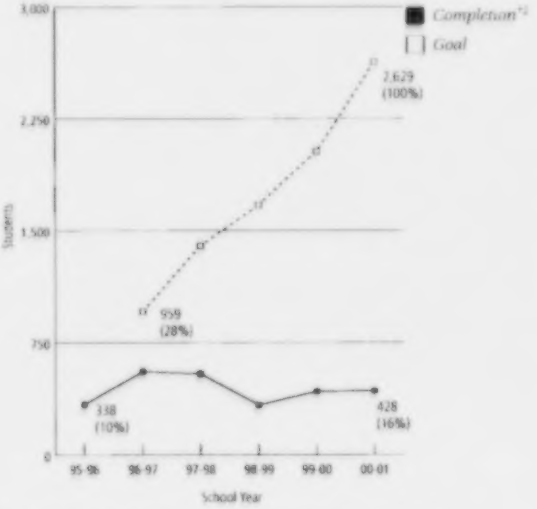
GOAL C: The number and/or percentage of 9th grade students in the Jackson Public Schools who successfully complete Algebra I shall increase from 804* or 24.8%* to 3,247 or 100% of the total 9th graders. This is an average increase of 489 students per year over the five-year period of this award.

* Data are reported in TISC-2001 as 338 and 10.4%

The completion rates in Algebra I in 9th grade increased from 10% (388 students) to 16% (428 students) over the five years of the CPMSA program. This increase did not attain the ambitious goal outlined in the CPMSA Cooperative Agreement.

Figure 3.5

Algebra in 9th Grade[*1]



[*1] Annual goals based on an average percentage increase

[*2] Successful completion defined as a grade of "C" or better

( ) % of the total G9 population

	95 96	96 97	97 98	98 99	99-00	00 01
Total G9 Population	3,247	3,424	3,040	2,612	2,476	2,629
Enrollment	804	1,554	1,504	722	794	1,061
Completion	338	558	542	333	425	428
% Completion[*3]	10%	16%	18%	13%	17%	16%
Goal		959	1,398	1,672	2,030	2,629
Goal %[*3]		28%	46%	64%	82%	100%

[*3] % Completion of total G9 population

Enrollment and Successful Completion of Mathematics Gate-Keeping Courses in Grades 9-12

Grade 9-12 enrollment in Algebra II decreased from 1,698 students in 1995-96 to 1,539 in SY 2000-01. The decrease in enrollment coincided with a decrease in total grade 9-12 population (8,752 to 7,624) over the same time span.

Geometry enrollment in grades 9-12 nearly tripled over the five years of the CPMSA project, rising from 584 students in SY 1995-96 to 1,705 in SY 2000-01. These improvements were made despite the drop in total grade 9-12 population.

In four of the five years of the CPMSA program, enrollment and completion numbers for Trigonometry/Pre-Calculus in grades 9-12 were an improvement from the previous year. Overall, there was an increase in enrollment of 61 students (508 to 569) from SY 1995-96 to SY 2000-01.

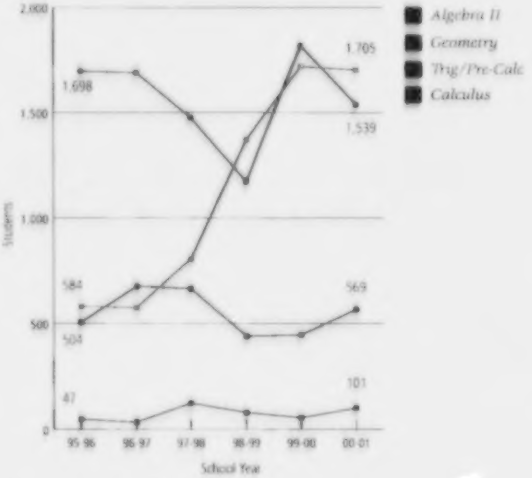
Calculus enrollment and completion by 9-12 graders also had considerable gains. Enrollment figures more than doubled from SY 1995-96 to SY 2000-01, rising from 47 to 101 students in that time span. Likewise, completion data rose from 47 to 89.

The percentage of students who successfully completed a mathematics gate-keeping course rose from 21% in SY 1995-96 to 32% in SY 2000-01. The largest increased occurred in SY 1999-00, when the completion percentage rose eight percentage points (from 25% in SY 1998-99 to 33% in SY 1999-00).

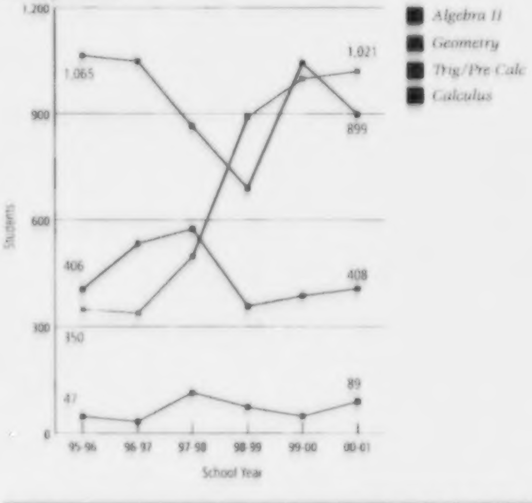
Figure 3.6

Mathematics Courses in Grades 9-12

Enrollment



Completion[1]



		95-96	96-97	97-98	98-99	99-00	00-01
G9-12 Population		8,752	8,774	8,483	7,920	7,619	7,624
Algebra II	Enrollment	1,698	1,691	1,479	1,173	1,819	1,539
	Completion	1,065	1,049	866	689	1,044	899
Geometry	Enrollment	584	578	809	1,372	1,721	1,705
	Completion	350	340	499	891	1,000	1,021
Trig / Pre-Calc.	Enrollment	508	678	667	441	448	569
	Completion	406	535	576	358	388	408
Calculus	Enrollment	47	34	123	79	55	101
	Completion	47	33	114	73	48	89
Enrollment		1,868	1,957	2,055	2,011	2,480	2,417
% Completion[2]		21%	22%	24%	25%	33%	32%

[1] Successful completion defined as a grade of "C" or better

[2] % completion of total G9-12 population

Enrollment and Successful Completion of Science Gate-Keeping Courses in Grades 9-12

Physics enrollment in grades 9-12 decreased slightly from SY 1995-96 to SY 2000-01, falling from 178 students to 150. However, the number of students successfully completing Physics in that same time span rose from 124 to 138.

Grade 9-12 enrollment in Biology increased by over 500 students from SY 1995-96 to SY 2000-01 (1,573 to 2,077 students). This increase was accompanied by a rise in completion from 900 to 1,065 students over the same time span.

Chemistry enrollment in grades 9-12 also experienced considerable gains, rising from 633 students in SY 1995-96 to 1,041 in SY 2000-01. Likewise, the completion figures rose from 390 to 690 during that time.

Similar to figures for mathematics gate-keeping classes, JPS students showed an increase in completion of science gate-keeping classes from SY 1995-96 to SY 2000-01. The percentage of students in grades 9-12 who completed a science gate-keeping class rose from 16% in SY 1995-96 to 25% in SY 2000-01.

Average Daily Attendance Rate

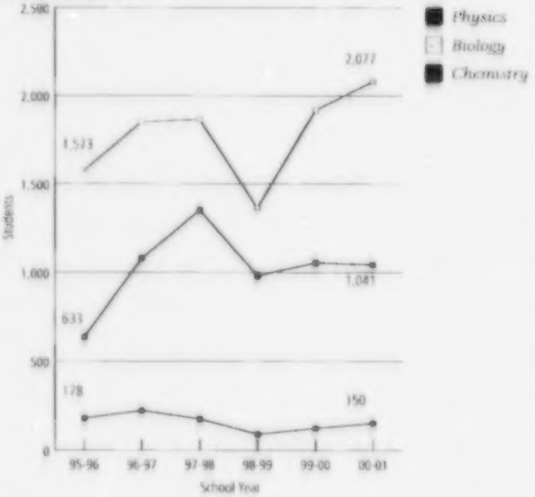
> **GOAL M: The Average Daily Attendance Rate of the JPS shall increase from 91.4% to 94.4, an average increase of 0.6% each year over the five-year period of this award.**

These data were not available until Year 3 of the CPMSA program. JPS raised its Average Daily Attendance rate from 92.9% in SY 1998-99 to 93.4% in SY 2000.01, an increase of 0.5%. This was one percentage point short of their goal of 94.4% attendance by SY 2000-01.

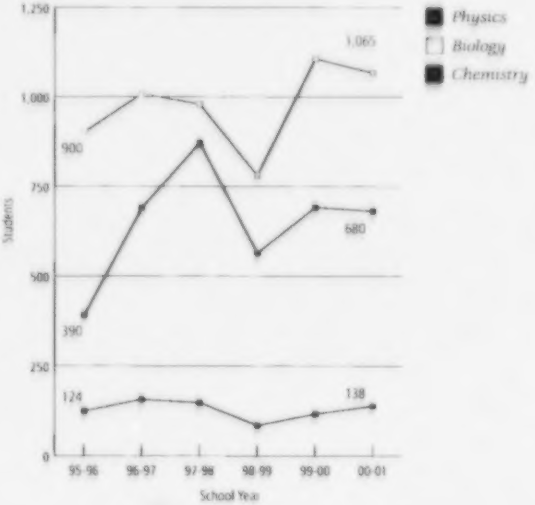
Figure 3.7

Science Courses in Grades 9-12

Enrollment



Completion[1]



		95 96	96 97	97 98	98 99	99 00	00 01
G9-12 Population		8,752	8,774	8,483	7,920	7,619	7,624
Physics	Enrollment	178	221	173	88	122	150
	Completion	124	156	147	84	116	138
Biology	Enrollment	1,573	1,848	1,861	1,360	1,915	2,077
	Completion	900	1,007	978	779	1,105	1,065
Chemistry	Enrollment	633	1,077	1,350	979	1,053	1,041
	Completion	390	689	870	563	691	680
Enrollment		1,414	1,852	1,995	1,426	1,912	1,883
% Completion[2]		16%	21%	24%	18%	25%	25%

[1] Successful completion defined as a grade of "C" or better.

[2] % completion of total G9-12 population.

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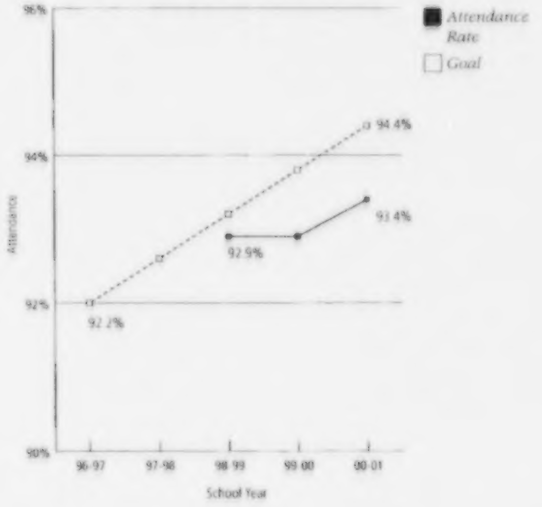
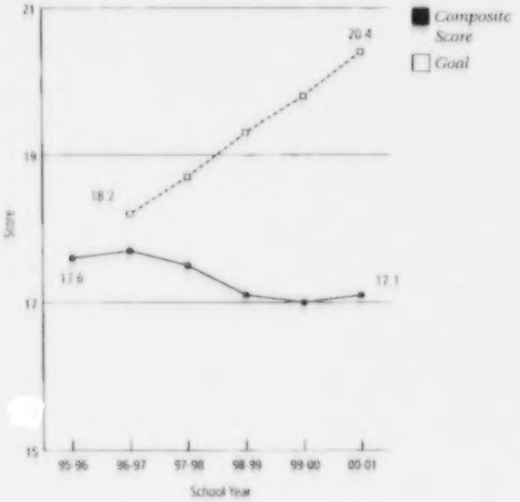
Figure 3.8
Average Daily Attendance Rate



SY	96-97	97-98	98-99	99-00	00-01
K-G12 Population	32,636	32,235	31,661	31,208	31,235
Attendance Rate	m	m	92.9%	92.9%	93.4%
Goal	92.0%	92.6%	93.2%	93.8%	94.4%

Figure 3.9
ACT Composite Scores



SY	95-96	96-97	97-98	98-99	99-00	00-01
Composite Score	17.6	17.7	17.5	17.1	17.0	17.1
Goal		18.2	18.7	19.3	19.8	20.4

ACT Composite Scores

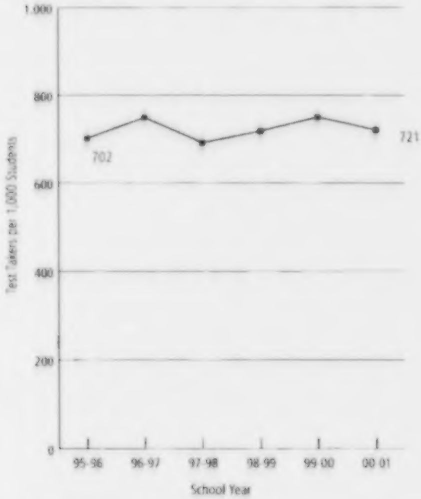
> **GOAL N: The average ACT composite score of JPS students shall increase from 17.4* to 20.4 over the five-year period of this award. This is an average increase of 0.7* mean scaled score points per year.**
>
> * Data is reported as 17.6 in TISC-2001, thus the average increase is 0.56 mean scaled score points per year.

JPS failed to reach their goal of an average ACT composite score of 20.4. Over the five years of the CPMSA program, their average score fell from 17.6 to 17.1.

The number of students taking college entrance exams is an indicator of their intention to pursue post secondary education. As shown in Figure 3.10, the number of ACT test takers per 1,000 students rose through SY 1999-00 to 751 students per 1,000 before declining in SY 2000-01 to 721, an increase from the Baseline Year 1995-96.

Figure 3.10

ACT Test Takers per 1,000 Students



SY	95-96	96-97	97-98	98-99	99-00	00-01
Total G12 Population	1,491	1,531	1,583	1,557	1,549	1,497
Test Takers	1,046	1,149	1,095	1,119	1,164	1,079
Test Takers per 1,000	702	750	692	719	751	421

Other college entrance exam results can be used to measure student achievement. The following presents AP and SAT data.

AP Mathematics

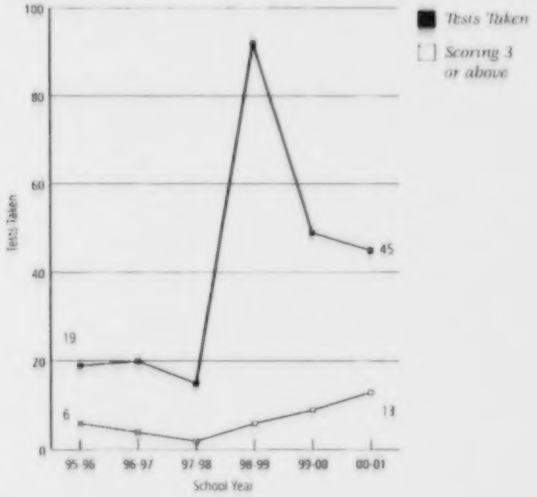
By SY 2000-01, JPS had more than doubled the number of AP Mathematics tests taken to 45 (from 19 in SY 1995-96), with a peak of 92 in SY 1998-99. JPS achieved this success despite a drop in the total grade 11 and 12 population of almost 200 students. The number of students scoring 3 or above also more than doubled from 6 students in SY 1995-96 to 13 students in SY 2000-01.

AP Science

Similar to their results in AP Mathematics, JPS students showed improvement in AP Science exams over the five years of the CPMSA program. The number of tests taken rose from 21 in SY 1995-96 to 83 in SY 2000-01, peaking at 160 in SY 1998-99. The number of tests taken per 1,000 students rose from 6.5 to 27.4 over that same time span.

Figure 3.11

AP Mathematics[*1] Test Results from May 1996 to 2001

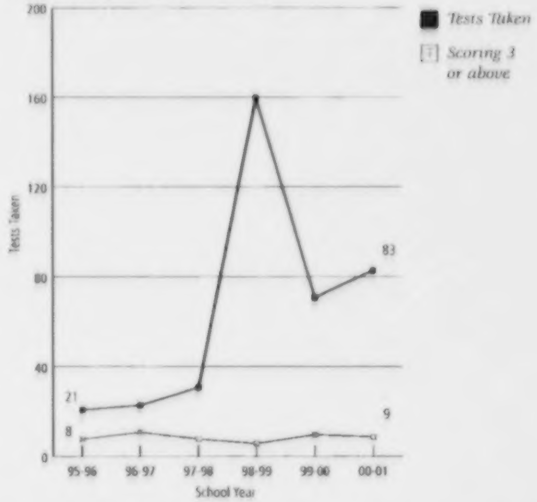


SY	95-96	96-97	97-98	98-99	99-00	00-01
Scoring 3 or Above	6	4	2	6	9	13
Scoring 3 or Above per 1,000 students	1.9	1.2	0.6	1.9	2.9	4.3

[*1] Includes Calculus AB, Calculus BC, and Statistics

Figure 3.12

AP Science[*1] Test Results from May 1996 to 2001



SY	95-96	96-97	97-98	98-99	99-00	00-01
Scoring 3 or Above	8	11	8	6	10	9
Scoring 3 or Above per 1,000 students	2.5	3.4	2.5	1.9	3.2	3.0

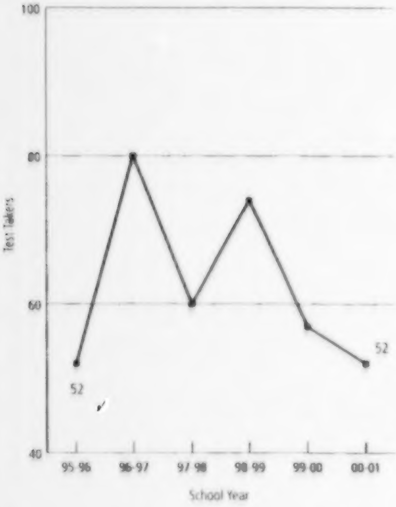
[*1] Includes Biology, Chemistry, Environ. Science, Physics B, Physics Mech., & Physics Elec.

SAT – Mathematics

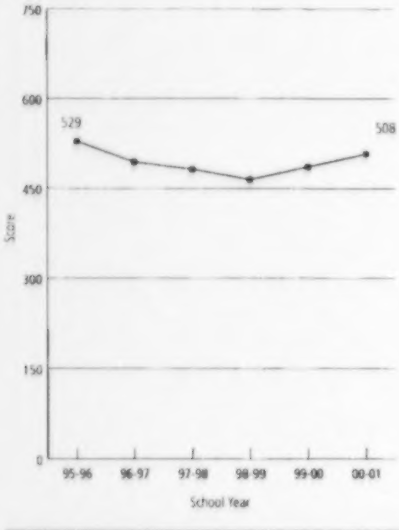
SAT test-takers in JPS remained stable at 52 between SYs 1995-96 and 2000-01. Over the five years of the CPMSA program, the mean score of the mathematics portion of the SAT fell from 529 to 508. The mean score is recovering from a low of 465 in SY 1998-99.

Figure 3.13

Number of SAT Test Takers



SAT Mathematics Mean Score



SY	95-96	96-97	97-98	98-99	99-00	00-01
Test Takers	52	80	60	74	57	52
Mean Score	529	494	482	465	486	508

CONCLUSION

The CPMSA project in Jackson, MS has had a considerable and extensive impact on JPS' reform efforts in mathematics and science. Numerous reform areas were affected including curriculum, instruction, assessment, professional development, partnerships, and policy formation. Both JPS teachers and administrators credit CPMSA with introducing positive changes throughout the district.

Central to the JPS reform effort was ensuring standards-based curricula for mathematics and science courses. According to the *Tabulated Indicators for Systemic Change (TISC 2000)* in SY 1995-96 only 10% of all schools in the Jackson Public School District were using a standards-based curriculum. By SY 2000-01 JPS had aligned with standards set by the National Council of Teachers of Mathematics (NCTM) and the National Science Teachers Association (NSTA) resulting in 100% of JPS schools having standards-based mathematics and science curricula. Along with this movement towards standards-based curriculum was an effort to have more hands-on, inquiry-based instruction, such as the *Algebra Project*, which trained teachers over the summer and interspersed them throughout the district to maximize the number of students reached by the project.

Professional development practices were reformed with a particular focus on mathematics and science teachers. Over 97% of all K-12 teachers participated in professional development activities. Due to the large number of teachers involved, an infrastructure was established to support and maintain consistent professional development efforts.

Numerous partnerships were formed between JPS and the surrounding community. The most prominent was with Jackson State University (JSU), which gave rise to the Center of Excellence for Research, Teaching, and Learning (CERTL). CERTL focused on supplementary teacher enhancement and student enrichment activities in a hands-on, minds-on interactive laboratory setting. Training sessions were offered to JPS teachers for this program as well as a science and mathematics summer day camp for elementary and middle school students.

During the CPMSA project, JPS turned sharply towards a more 'data driven' system of policy analysis and development. Changes were made to guarantee that teachers, administrators, and school officials closely examined student achievement data before making decisions on curriculum policy.

Although progress has been made, JPS still has many obstacles to overcome. Successful completion of Pre-Algebra and Algebra I showed a slight increase but remained far below the goals set at the inception of the CPMSA project. Mathematics gate-keeping courses showed little to moderate improvement during the time of CPMSA. Algebra II completion fell from 1,065 to 899, Geometry completion grew from 350 to 1,021 by the end of the program, Trigonometry/Pre-Calculus remained steady, and Calculus enrollment rose from 47 to 89.

While the ACT composite score dropped slightly from 17.6 in SY 1995-97 to 17.1 in SY 2000-01, the number of test-takers per 1,000 students increased from 702 students in SY 1995-96 to 721 students in SY 2000-01. In SY 1999-00 the number of students per 1,000 peaked at 751, which can be viewed as an indicator of more students interested in pursuing higher education beyond the high school level.

JPS recognizes the need for dedicated work beyond the CPMSA project and will continue their reform efforts with their Urban Systemic Program (USP). Steps were taken in the right direction, particularly when it came to professional development and addressing the needs of a standards-based and data-driven school district. However, there is much room for improvement across the board in all areas of student achievement data.

Section IV

PROJECT TEAMS: TOGETHER, EDUCATING ALL IN MATHEMATICS AND SCIENCE – LAREDO INDEPENDENT SCHOOL DISTRICT

LOCATED IN THE CITY OF LAREDO, the Laredo Independent School District (LISD) is a minority-majority urban school district with 30 schools: 21 Elementary Schools, five Middle Schools, and four High Schools. In SY 2000-01, LISD had 809 teachers and 22,508 students. LISD's close proximity to Mexico is reflected in the characteristics of the student population. The vast majority of students (98.8%) and teachers were of Hispanic descent, and about 56% of the student population was classified as being "Limited English Proficient" in SY 2000-01. Although Laredo is growing economically, many residents of Laredo and LISD students face economic hardship; 71% of LISD students were eligible for Free/Reduced Price Lunch programs (TISC-2002).

LISD pursued a CPMSA grant to address the issue of underrepresentation of Hispanic students in college preparatory classes in science and mathematics. In addition, TAAS (Texas Assessment of Academic Skills) and SAT (Scholastic Aptitude Test) results indicated that scores for Hispanic students were substantially lower than their White counterparts. In SY 1996-97, LISD reported that only 48% of Hispanic 10th grade students passed the TAAS mathematics test; in contrast, 70% of Whites passed. SAT results showed similar trends; in SY 1996-97, over 97% of LISD students scored below 1,000 on the SAT. The difficulties Hispanic students were experiencing in mathematics and science were also illustrated in the district's Advanced Placement (AP) test results. In 1996-97, only three students out of the 45 students who took the exam scored 3 or above in Calculus. That same year, only two out of 19 students

Laredo Independent School District: Facts in Brief (SY 2000-01)

Total Students: 22,508

American Indians: < 0.1% (3)
Asian/Pacific Islander: 0.1% (24)
Black (Not Hispanic): 0.1% (22)
Hispanic: 98.8% (22,234)
White (Not Hispanic): 1% (225)

Male: 51% Female: 49%

Students Enrolled in:
Elementary Schools: 49%
Middle schools : 23%
High Schools: 29%
Ungraded Schools: <0.1%

Schools: 30

Elementary Schools: 21
Middle Schools: 5
High Schools: 4

Mathematics and Science Teachers: 809

Elementary School Teachers: 614
Middle School Mathematics Teachers: 67
High School Mathematics Teachers: 56
Middle School Science Teachers: 32
High School Science Teachers: 40

Selected Key Indicators

Free/Reduced Price Lunch Eligible: 71.0%
Special Education: 13.6%
Limited English Proficient: 55.8%

Sources:
- *Tabulated Indicators for Systemic Change (TISC-2002)*, Systemic Research, Inc.
- Core Data Elements, 2000, Westat, Inc.
- LISD 2000-2001 Evaluation Report

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scored 3 or above on AP Science (biology, chemistry, and physics) exams taken.

The proposed CPMSA project, Together, Educating All in Mathematics and Science (TEAMS), was aimed at restructuring the district's Pre-K-12 mathematics, science and communications program (i.e., addressing language needs), with the goal of significantly increasing minority participation and performance in college preparatory science, engineering and mathematics (SEM) courses. On September 1, 1997, LISD was awarded a five-year, $3.4 million CPMSA grant.

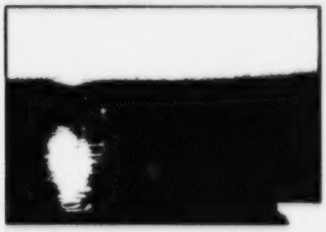
A Profile of Laredo, Texas

Laredo is located in south Texas on the US-Mexico border along the north bank of the Rio Grand River. The city, also known as the "Gateway City," maintains three border crossings with the Mexican state of Tamaulipas at Neuvo Laredo and one with the Mexican state of Nuevo Leon at Columbia. Laredo's border location has allowed it to develop into the principle port of entry into Mexico. Consequently, international trade has become one of the major industries in Laredo.

The 2000 US Census estimates the population of Laredo to be approximately 176,576. Laredo is almost entirely Hispanic (of Mexican heritage), at over 96%. Laredo has experienced considerable growth over the last decade and according to the US Census Bureau is one of the fastest growing cities in the US, with a growth rate close to 45% from 1990-2000.

The median household income in Laredo is $29,108, with a per capita income of $11,084. The 2000 unemployment rate in Laredo was 5.6%.

Laredo has two separate school districts, Laredo Independent School District (LISD) and the United Independent School District (UISD). Laredo is also home to two institutions of higher education: Laredo Community College (LCC) and Texas A&M International University (TAMIU).



Laredo, TX ■

PROJECT TEAMS OBJECTIVES AND STATEMENT OF WORK

As a requirement of the CPMSA grant, LISD signed a cooperative agreement with NSF outlining fiscal and administrative requirements for implementation. The overarching objectives of the cooperative agreement emphasized student outcomes:

- Develop systemic approaches that will substantially increase the number of students enrolling in and successfully completing pre-college science, engineering, and math (SEM) courses
- Substantially increase the number of "college preparatory tract" graduates
- At the end of five years, position all high school students to enroll in Algebra I.

The statement of work addresses areas of reform as outlined in Table 4.1.

IMPLEMENTATION STRATEGIES

Project TEAMS was a five-year grant implemented across all schools in LISD. It began under the direction of the Principle Investigator (PI), Mrs. Graceila Ramirez, Superintendent, and Mr. Humberto Trevino, Assistant Superintendent. In the second year of the project, Dr. Paul Cruz assumed the positions of Superintendent and PI. Other primary CPMSA staff included a Project Director and district evaluator. The Project Director was responsible for overseeing planning, staff development, fiscal administration, and overall monitoring of the project.

In addition to CPMSA staff, an advisory committee was created with community members, parents and representatives from Laredo Community College (LCC) and Texas A&M International University (TAMIU). The committee was created for the purpose of supporting the academic structure, planning and monitoring of CPMSA activities.

A brief synopsis of the first four years of CPMSA implementation is presented in Table 4.2.

Table 4.1

Areas of Reform and Statement of Work

Areas of Reform	Statement of Work from Cooperative Agreement
Curriculum, Instruction and Assessment	• Develop strategies in collaboration with the schools in LISD with respect to Gate-Keeping courses and to implement strategies with assistance from NSF that will substantially increase enrollment and successful completion of these targeted classes and subject classes • LISD will implement an articulated, standards based curriculum, instructional, and assessment program
Policy	• Balanced emphasis shall be placed on all phases of the K-12 academic program with major emphasis on mathematics and science enrichment and a specific focus in grades 4-12.
Partnerships/Broad Based Support/ Convergence of Resources	• Special efforts shall be made to also include industrial partners and parents, as well as organizations serving underrepresented groups outside of formal educational structures as appropriate in the CPMSA's activities. • CPMSA shall function in a complimentary way and coordinate with other related NSF Resources funded educational activities (e.g., State Systemic Initiative and Urban Systemic Initiative.) • Efforts shall be made coordinating the partners involved in the various NSF supported programs, as well as pre-college programs supported by other federal agencies to avoid duplication, and to share resources to maximize the available funding.
Professional Development	• The CPMSA school district shall also design and implement coordinated staff development that support this articulated, standards-based program development.
Student Achievement	• Student achievement goals from the Cooperative Agreement are listed and addressed in the last section of this case story, "Achievement Data."

Source: *Project TEAMS: Together Educating All in Mathematics and Science, Cooperative Agreement*

Table 4.2

Brief Synopsis of CPMSA Implementation

School Year	Implementation Activities
1997-98	• Initialized broad based support through meetings with all stakeholders • Began a comprehensive, sustained professional development plan • Disseminated baseline data and performance objectives for ° Advanced mathematics and science courses ° College entrance exams ° Middle school algebra
1998-99	• Developed a local accountability system aligned to Site-based Decision Making (SBDM): ° District Assessments ° Campus Performance Objectives (CPO's) • Began curricular reform in mathematics and science • Created a professional development database • Increased classroom monitoring efforts
1999-00	• Initiated policy reform to assure systemic support of reform efforts: ° Convergence of resources ° Graduation plans ° Professional development • Embedded systemic reform drivers into District Strategic Plan • Developed Instructional Model
2000-01	• Modified activities based on NSF site visit recommendations • Wrote district academic standards • Focused on developing instructional leadership

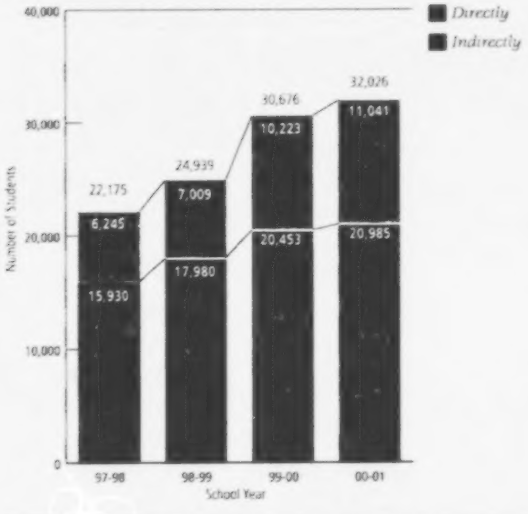
Source: *Project TEAMS: Together Educating All in Mathematics and Science, "Annual Report Year 3 (1999-2000)"*

Through the first four years of the grant, LISD was successful at progressively increasing the number of students impacted by Project TEAMS. As shown in figure 4.1, the number of students directly and indirectly affected by the CPMSA grant increased from 22,177 in SY 1997-98 to 32,026 in SY 2000-01.

Note: The discrepancy between the number of students affected by Project TEAMS and total students in LISD is a result of some students being both directly and indirectly impacted.

Figure 4.1

Number of Students Impacted by Project TEAMS



CURRICULUM, INSTRUCTION AND ASSESSMENT

LISD and Project TEAMS staff recognized that enacting standards-based curriculum, instruction and assessment was a prerequisite for systemically improving student achievement in mathematics and science. In addition, other challenges were presented by Laredo's geographic location near the US-Mexico border, including the need for the development of English language skills to be integrated into mathematics and science education.

Through Project TEAMS four strategies were employed to achieve district-wide reform in mathematics and science standards-based curriculum, instruction and assessment: 1) distribution of the PK-12 science and mathematics curriculum guides and training of all teachers, 2) articulation of the integration of mathematics and science in the PK-12 curriculum, 3) integration of reading, writing and oral communication skills in mathematics and science classes; and 4) incorporation of technology into the standards-based science and mathematics curriculum (Ref. 6).

Standards-Based Curriculum

Efforts to standardize and develop the mathematics curriculum resulted in solid progress in several areas being made from the inception of the CPMSA grant to SY 2000-01. During SY 1999-00, mathematics and science curriculum standards based on the state-mandated Texas Essential Knowledge and Skills (TEKS) were created and distributed to PK-12 teachers. By establishing these curriculum standards several important goals were achieved: vertical alignment of PK-12 curriculum, strong preparation for enrollment in AP courses, and explicit and clear communication of student performance standards.

New course materials and teaching strategies were developed and implemented throughout the entire system. For example, specific timelines were developed for the training of teachers and implementation of *Connected Mathematics* in grades 6, 7, and 8. Feedback from high-school mathematics teachers and local colleges enrolling LISD graduates to administrators and

Students Impacted	SY 1997-98		SY 1998-99		SY 1999-00		SY 2000-01	
	Directly	Indirectly	Directly	Indirectly	Directly	Indirectly	Directly	Indirectly
Grades K-5	1,225	4,850	1,320	6,300	8,693	11,941	8,252	10,250
Grades 6-8	870	17,850	1,011	1,980	810	4,561	1,946	4,778
Grades 9-12	4,150	9,300	4,678	9,700	720	3,951	843	5,957
Total	6,254	15,930	7,009	17,980	10,223	20,453	11,041	20,985
Grand Total	22,175		24,939		30,676		32,026	

Source: LISD 2000-01 Evaluation Report

middle school faculty indicated that there was a pervasive need to significantly improve the quality of analytical skills in mathematics and science. The *Connected Mathematics* curriculum materials, which were funded by the National Science Foundation, were adopted by LISD to address this need. *Connected Mathematics* was specifically designed to enable students to develop essential skills and reasoning ability in geometry, measurement, algebra, probability, and statistics. Teachers agreed that they were receiving positive feedback from the high schools regarding the "analytical" abilities of the students in their mathematics and science courses that were taught with the *Connected Mathematics* materials.

Project TEAMS and LISD further supported mathematics curriculum efforts by providing additional resources and material/technological support. The purchase of Explorer® calculators and classroom sets of *Connected Mathematics* books was funded by Project TEAMS. Ancillary support and training was also made available; for example, in SY 2001-02 Project TEAMS sponsored five-day Explorer® Calculator training for 30 teachers.

Similar progress was made in the effort to implement standards-based curriculum in the sciences. A science framework was established, also based on TEKS, and Project TEAMS funded different support initiatives. As an example, *Full Option Science System* (FOSS) training and materials were purchased to support hands-on science activities in grades 3-5.

Standards-Based Instruction

To support the implementation of standards-based curriculum, substantial efforts and resources were directed to improving the quality of instruction and aligning teaching methods with the curriculum.

Training was broadly supported in a number of areas with CPMSA funds; for example, in SY 2000-01, 48 middle school teachers were trained in *Connected Mathematics*. In addition, follow-up training was provided for new middle school mathematics teachers in *Connected Mathematics* during the quarterly mathematics teacher meetings and Saturday sessions.

During site visit interviews, many mathematics teachers expressed enthusiasm about the new instructional strategies that were being implemented as a result of Project TEAMS. One teacher speaking about *Connected Mathematics* stated that at first there was a lack of appreciation for the material because it challenged the conventional way of teaching; however, as the methods were better understood the attitude changed, "As time went on and we received more training and were better able to instruct the class, I saw that I enjoyed teaching the course very much and that students were much more responsive."

Other professional development activities focusing on curriculum and instruction that occurred during SY 2000-01 included a three-day summer institute in the standards-based FOSS program for 203 3rd and 4th grade teachers, and 30 teachers attended Project GLOBE (Global Learning and Observation to Benefit the Environment), a standards-based environmental education program.

Project TEAMS has also been involved in LISD's annual Science, Mathematics and Reading Teachers (SMART) conference, a professional development conference dedicated to interdisciplinary standards-based instruction. The conference has allowed science, mathematics and reading teachers to present teaching strategies and curriculum related to their subject field. The 2002 SMART conference involved over 1,200 teachers and 500 paraprofessionals.

To ensure that standards-based instruction is being enacted effectively, science and mathematics trainers support and monitor the implementation of instruction. Master teachers, principals, assistant principals and curriculum specialists also monitor classroom instruction.

Standards-Based Assessment

LISD uses several instruments to ensure that assessment goals are being met. The TEKS define the basic content of the instructional and assessment program in the state of Texas, and outline the required knowledge and skills of every student. TEKS are based on standards set by the National Educational Service and Project 2061 National Science Standards. The basic content of TEKS are assessed through the Texas Assessment of Academic Skills (TAAS) test and mathematics assessment tests developed by the LISD.

Mathematics assessment using the TAAS occurs in the 3rd through 8th grade, 10th grade and after completing Algebra I. District Mathematics Assessment tests are also used in 1st through 8th grades, 10th grade, and after completing Algebra I. LISD 8th grade students take the TAAS to measure science, and at the end of Biology I (usually 9th grade) take a District Science Assessment test.

POLICY

The initial role of Project TEAMS on policy implementation and reform was a relatively minor one, with effects limited to those teachers, administrators, and departments directly involved in Project TEAMS. Through the efforts of administrators and Project TEAMS leadership, including Co-principal Investigator Sylvia Bruni, Project TEAMS evolved into the driving force behind all of LISD school reform efforts.

Project TEAMS established four general objectives for policy reform: 1) develop department action plans that align with the district strategic plan, 2) align district policies with Project TEAMS overall goals, 3) develop district policies to serve as incentives for teacher practices that support the goals and objectives of Project TEAMS, and 4) develop district policies in the areas of standards-based curriculum, instruction, assessment, and equal access for all students (Ref. 6).

In addition to the general objectives outlined above, LISD incorporated a policy of accountability at every level of LISD related to student expectations, curriculum implementation, and instructional practices. Former superintendent Dr. Paul Cruz was one of the main proponents in instituting a system that promoted accountability. All of LISD's reform goals were assigned to a team comprised of members of the superintendent's cabinet. Each team planned an implementation strategy for its goal, followed by formative and summative evaluations. During a telephone interview Dr. Cruz commented on the system of increased accountability, "Every single task had a specific individual tied to it. I would sit down with them three times a year and see how we were progressing."

Central to curricular reform was the effort by administrators, principles, and teachers to raise high school graduation requirements above the Minimum High School Program set by the Texas Education Agency. Prior to Project TEAMS, district mathematics and science requirements were nearly aligned to this program – three years of mathematics up to Algebra II, and two years of science to be selected from physical science, biology, and chemistry.

In interviews with administrators and teachers, the belief was expressed that using the state's Minimum High School Program as an explicit option for students was ultimately serving to "lower the bar" in regards to expectations of students and teachers. Of great concern was that these low expectations were positioning students for limited achievement in the classroom, resulting in students who were unprepared to succeed in mathematics and science at the post-secondary level.

Texas Graduation Plans

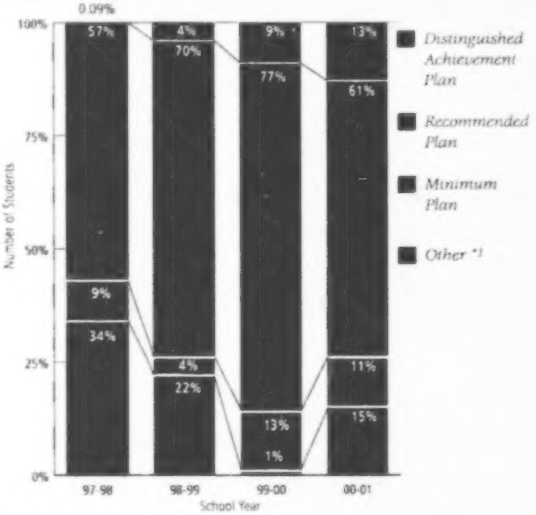
Minimum Plan - Requires three years of math (at least up through Algebra I) and two years of science (at least one of which must be Biology, Chemistry, and/or Physics).
Recommended Plan - Requires three years of math (Algebra I, II, and Geometry) and three years of Science (Biology, Chemistry, and Physics).
Distinguished Achievement Program (DAP) - Same as above recommended, except must also include any of the following additional achievements: original research, 3 or above on AP test, PSAT scholar or college credit with a grade of B or higher.

Due to the influence of Project TEAMS, LISD adapted the graduation policy in SY 1999-00 to require students to complete four years of mathematics and three years of science; students were only granted permission to graduate under the Minimum Plan as a final option in special circumstances.

The enacted policy change has already begun to yield positive effects: from SY 1997-98 to 2000-01, LISD saw an increase in students graduating under the Recommended Program (57% to 61%) and DAP (.09% to 13%) as shown in Figure 4.2.

Figure 4.2

Percentage of LISD 12th Grade Students Graduating Under Three Plans



*1 LISD students not graduating under Texas Graduation Plans
Source: LISD 2000-2001 Evaluation Report

The district as a whole has consistently achieved above the state average with respect to the percentage of students graduating under the Recommended and DAP programs. In SY 1999-00, Texas high schools graduated, on average, 38.6% of their students under the Recommended and DAP Program compared to 86% for LISD (Ref. 9). One LISD high school in particular has done exceptionally well; Martin High School, LISD's oldest high school, is ranked first in the state for percentage of students graduating under these plans. In 2000, over 96% of Martin High School graduates graduated under the Recommended plan or DAP (Ref. 10).

CONVERGENCE OF RESOURCES

Convergence of Project TEAMS' human and material resources with other ongoing programs and available funds was a key strategy in maximizing the impact and reach of the CPMSA grant. Efforts to converge resources reached across all reform initiatives, but focused primarily on professional development and curricular reform.

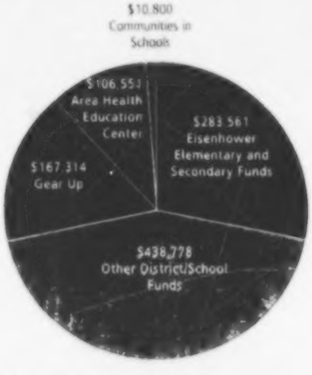
According to the LISD 2000-01 Evaluation Report, prepared for submission to NSF, district and federal funds were used together to sponsor several different professional development programs. For example, in SY 2000-01, over $100,000 of Project TEAMS and Eisenhower Title II funds were pooled for professional development activities impacting over 725 teachers.

Project TEAMS' curricular reform efforts were subsidized through a combination of funds; as an example, district Title I funds were used to purchase $30,000 of elementary school FOSS materials, and campus federal funds were used to purchase an additional $11,000 worth of FOSS materials. The core functions and overall management of Project TEAMS are also supported through non-CPMSA resources. Three elementary mathematics trainer salaries were fully funded through LISD at a cost of over $150,000. The district evaluator and data manager, central to the efforts of Project TEAMS, were jointly funded through LISD and Title I funds.

LISD intends for resource convergence to play a continuing role in reform and thus has taken steps to better identify opportunities for the future. Since SY 1997-98 it is required that district fund requests (e.g., staff development activities, purchase of materials and supplies, consultative services) be aligned to reform goals outlined by Project TEAMS.

Figure 4.3

Additional LISD Funding (SY 2000-01)



Source: 2000-01 Core Data Elements

PARTNERSHIPS: BROAD BASED SUPPORT

Strong partnerships within the community have played a significant role in advancing Laredo Independent School District's (LISD) school reform efforts. Broad based support from institutions of higher learning, business and industry, and parents is visible throughout LISD and has contributed to the expansion and improvement of science and mathematics educational reform efforts. Local business and community organizations were, and continue to be, actively encouraged to support mathematics and science programs through contributions of personnel, resources, publicity, and internships aimed at improving the quality of instruction and student achievement.

Project TEAMS had four primary goals for their partnership efforts:

1. To inform the general public of the benefits of Project TEAMS at LISD
2. To coordinate the efforts of community organizations that support mathematics and science education in LISD through the Project TEAMS Advisory Board
3. Improve community, business and higher education support for increased student achievement in mathematics and science
4. Increase the recognition and visibility of Project TEAMS

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Community Partnerships

Project TEAMS has successfully assisted LISD in establishing a wide range of alliances with different community partners. Strong and steady progress has been made towards the partnership goals by continuing to forge new alliances and further developing the existing ones. Table 4.3 lists some of the community partners and the Project TEAMS activities they supported.

One of the most successful partnerships was with The Mid Rio Grande Area Health Education Center (AHEC). AHEC and Project Teams were able to provide several year-round enrichment programs to over 900 3rd-12th grade students between SYs 1996-97 and 2001-02. AHEC also funds a Summer Bio-Medical Enrichment Camp for high school students at the University of Texas Health Science Center (UTHSC); a portion of student expenses were also paid through a partnership of UTHSC and LISD.

The Med Prep program, designed for students seeking careers in the medical professions, is the result of Project TEAMS' partnerships with several public and private medical organizations and institutions of higher learning including Mercy Hospital, Doctor's Hospital, the Laredo Medical Group (LMG), the Health Alliance of Laredo (HAL), and Laredo Community College. The Med-Prep Program provides 16 Saturday enrichment sessions for students seeking careers in the medical profession.

Business and Industry

Business and industry sponsors supported a range of scholarships. For example, the Texas Business and Education Coalition (TBEC) and the Laredo Chamber of Commerce sponsored the Texas Scholars Program by providing scholarships to students graduating with advanced mathematics and science courses.

The Med-Prep Program provided 16 Saturday sessions to students interested in health science careers. Health care professionals from area hospitals exposed students to different careers in the health care field.

Another example is Sanchez-O'Brien Oil & Gas Company. In addition to contributing funds to the annual science fair, they provided speakers and career mentors on a monthly basis to LISD students in the fields of mathematics, science, and technology.

Institutions of Higher Learning

LISD's school reform efforts have been heavily supported by partnerships with several institutions of higher education. For example, LISD has partnered with Texas A&M International University (TAMIU) to

Table 4.3

Community Partnerships

Institution	Project TEAMS Partnership Activity	Target Population
Mercy Hospital	• MED Prep • Health Outlooks • Science Fair	• 3rd-12th graders
Laredo Children's Museum	• Elementary Field Trips	• Elementary Students
Health Alliance of Laredo	• MED Prep • H_2O Program	• High School Students
Webb County Alliance for Minorities in Engineering	• Science Fair • Physics Olympics • Science at the Mall • Physics Phun • Rat Trap races	• 3th-12th graders
Mid Rio Grande Area Health Education Center (AHEC)	• H_2O camps for enrichment in Mathematics and Science • Gear-Up Algebra Enrichment • Middle School Algebra Camp • High School Geometry Camp • Middle School Science Camp the PSAT/SAT Smith, • Dewar Camp	• 3rd-12th graders

assist in the implementation of the GEAR-UP grant awarded to LISD. GEAR-UP is a program designed to increase the number of low-income students who are prepared to enter and succeed in postsecondary education. TAMIU provided a number of different support services for the GEAR-UP program, including TAMIU students serving as tutors for the mathematics classes, mentoring, academic counseling, summer programs, and career exploration activities. TAMIU also coordinated parental involvement activities exploring different topics pertinent to parents and their children, such as planning for high school graduation, financial aid for college, standardized test preparation, and career choices.

Office of Postsecondary Education's GEAR-UP grant: Texas A&M International University students served as tutors for the math classes.

A partnership with Laredo Community College (LCC) allowed high school students to enroll in classes through distance learning programs. A partnership with the University of Texas, San Antonio Health Science Center (UTHSC), funded by the Kellogg Foundation, provided teacher professional development and student enrichment programs for LISD. Table 4.4 presents a brief summary of partnerships with institutions of higher learning.

Parents

Increased parental involvement was, and continues to be, a high priority objective of Project TEAMS' partnership efforts. It was evident across a variety of areas in LISD. The district Parental Involvement Conference is held annually to demonstrate mathematics and science activities that enable parents to assist their children with schoolwork.

Parent's Night, Booster Club meetings, and extensive volunteer opportunities were some of the avenues for increased parental involvement in LISD schools made possible by the CPMSA grant. The foundation was set to develop and foster future initiatives to expand parental outreach efforts despite the significant language and economic barriers that historically have served to make partnerships and communication between parents and LISD complicated and challenging.

Different strategies were employed to communicate important information to the public. Informational meetings regarding policy reform issues were held and televised via Public Access television. These issues were presented to different community organizations responsible for overseeing reform efforts, including the Campus Educational Improvement Council (CEIC) and District Educational Improvement Council (DEIC).

Table 4.4

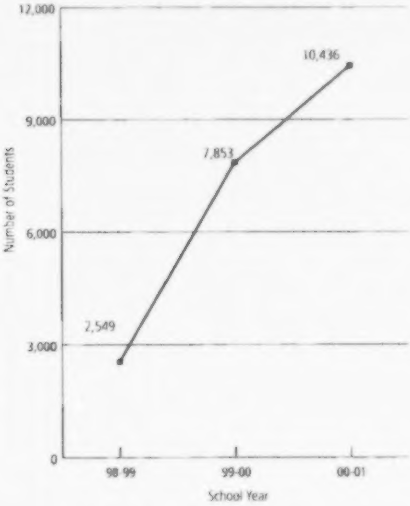
Institutions of Higher Learning Partnerships

Institution	Project TEAMS	Target Population
Laredo Community College (LCC)	• Distance learning and Concurrent Enrollment • Science Department Advisory Board and Environmental Science Center • Provided support for TEAMS Advisory Board • GLOBE (Global Learning and Observations to Benefit the Environment) Camp	• LISD science students • TEAMS advisory board and staff • LISD science students
Texas A&M International University (TAMIU)	• TEX PREP program • AP Conferences • Nursing Advisory Board • SAT Saturday sessions • Provided a summer camp for future engineering students	• LISD science students • Future engineering students • Future nursing students • College bound high school juniors and staff
University of Texas Health Center at San Antonio	• STEER (The South Texas Environmental Education and Research Center Program) • Med Prep program • H_20 program • Summer bio-medical camp • Health science magnet school teacher development sessions	• LISD science students • Teachers

The most notable of these efforts was a series of forums called "Superintendent Neighborhood Chats." This was an open forum held at different locations, designed to discuss policy reform issues and academic standards with parents, business representatives, and employees of the district.

Along with "Superintendent Neighborhood Chats," Dr. Cruz initiated Caring Adults for Student Achievement (CASA) to inform parents of policy issues that affected their children. This effort was aimed at "meeting with parents in their own backyard–literally." Dr. Cruz felt that parents are most comfortable and receptive when they are in a familiar environment. Most significantly, these meetings were held in Spanish, a key decision in improving communication and parental motivation. At these informal open forums, often held at parents' homes, a variety of topics were addressed (e.g., LISD's school construction plans, important policy issues that affected students, the new Texas Assessment of Knowledge and Skills, and high school graduation requirements).

Figure 4.4
Students Impacted by Partnerships



Source: LISD 2000-2001 Evaluation Report

The continued development of these partnerships has resulted in a four-fold increase in the number of students impacted since the inception of Project TEAMS. In SY 1998-99, programs created or enhanced by partnerships impacted just over 2,500 students; in SY 2000-2001, the number of students impacted was over 10,000.

LEADERSHIP

Effective leadership played a significant role in advancing Project TEAMS' goals. "Wearing many hats" was a common theme communicated by administrators, principals, and teachers when discussing their responsibilities.

During interviews with LISD's teachers, administrators, and school board members, there was little disagreement that the district's former superintendent, Dr. Paul Cruz, embedded the goals of Project TEAMS into all of LISD's reform efforts. His efforts are credited for opening channels of communication between teachers and administrators and empowering principals to make the specific changes needed for their schools.

Dr. Cruz and other Project TEAMS leaders, Sylvia Bruni, Adriana Lombrana, Carla Perales, and Luis Munoz were instrumental in advancing a more "data driven" system. A framework for the disaggregation of assessment data was developed and procedures, such as regular individual meetings with principals throughout the district, were created to ensure that this framework served to facilitate analysis and guide improvement efforts. By adopting a more "data driven" system, new initiatives considered for implementation are now evaluated to ensure that they are grounded in research-based principles and include an evaluation component.

The shift to a more standards-based curriculum and assessment system, and the alignment of district goals was a main objective of Project TEAMS' leadership. Dr. Cruz noted when he began as superintendent "All the expectations were good. However, some were not complimentary; some were not aligned with each other; and some did not even mention students in their outcomes." He observed that schools lacked alignment in their objectives and he believed the misalignment was a major impediment to achieving their performance goals. "Although LISD had so many great staff and good people that wanted to work and make improvements, the structure of the organization was not a solid one; there were so many different expectations – I really wanted to talk with staff members and bring about some common goals and expectations." To help ensure that common goals were aligned a number of policy initiatives aimed at increasing communication among administrators and teachers in the district were put into place, which resulted in a clarification of individual goals and responsibilities.

Dr. Jerry Barber, the superintendent since November 2002, has worked to keep the reform efforts moving forward. The accomplishments of Project TEAMS have laid the groundwork for future efforts, and those currently in leadership positions have expressed a determination to reach the goals that Project TEAMS established. One Master Science teacher, describing the current situation stated, "We have come a long way, but we still have a long way to go. We made a lot of gains, and now we expect we will continue to make more."

PROFESSIONAL DEVELOPMENT AND LEAD TEACHERS

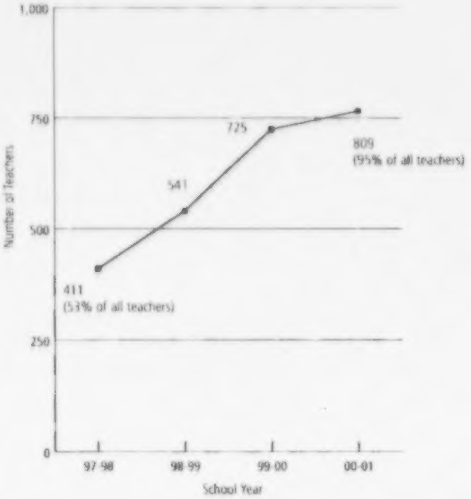
Policies were established to improve the quality and coordination of professional development for all schools within the district. The overarching objective was that training in standards-based programs and content be available for all schools' staff. Prior to Project TEAMS implementation, professional development participation was not required district-wide. Project TEAMS was instrumental in establishing requirements for training.

Beginning in SY 1999-00, mathematics and science K-12 teachers are required to participate in 60 hours of professional development in standards-based content annually. All secondary mathematics and science master teachers and elementary peer coaches are required to participate in 100 hours of professional development each year.

Interviews with teachers revealed that past professional development efforts resulted in low participation. To make professional development activities more convenient for LISD teachers, programs are provided during the summer, Saturdays and after school. Teachers responded to the changes in policies with increased participation and an appreciation for the benefits of the CPMSA grant.

Figure 4.5

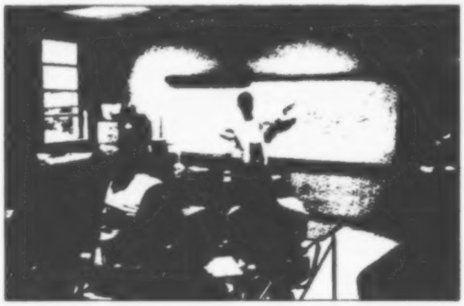
Teachers Who Received Professional Development



From SY 1997-98 to SY 2000-01, the number of mathematics and science teachers that received professional development increased from 411 in SY 1997-98 to 809 in SY 2000-01.

Critical guidance and mentoring for LISD's teachers came from the district's Master Teachers. Master science and mathematics teachers were chosen for these positions based on their superior performance. Their role is to oversee professional development efforts, provide leadership and training for other teachers, assist in assessment development, and ensure that curriculum standards are being met.

Master mathematics/science teachers must complete 100 hours of staff development annually in mathematics and science, compared to 60 hours for classroom mathematics and science teachers. Master teachers carry full course loads.



STUDENT ACHIEVEMENT IN MATHEMATICS AND SCIENCE

Student achievement goals for the CPMSA grant were based on the cooperative agreement between LISD and NSF that outlined several mathematics and science goals as follows:

Goal 1:	Increase TAAS passing rate at the 3rd, 4th, and 5th grade levels
Goal 2:	Increase Algebra I enrollment so 50% of district 8th graders will be enrolled and all students will be enrolled by 9th grade
Goal 3:	Double the number of high school students enrolled in SEM courses
Goal 4:	Increase Gate-Keeping course completion
Goal 5:	Increase enrollment and success in AP Science and Mathematics courses
Goal 6:	Increase number of students taking college entrance exams and raise scores

GOAL 1: LISD will enact policies and practices that will increase passing rates of the number of students tested from baseline years to the following:

- for 3rd graders, from 76% in SY 1996-97 (baseline) to 81% in SY 2000-01 to 85% in SY 2001-02;
- for 4th graders, from 79% in SY 1996-97 to 89% in SY 2000-01 and to 93% in SY 2001-02;
- for 5th graders, from 73% in SY 1996-97, to 84% in SY 2000-01, to 88% in SY 2001-02.

Results from mathematics assessment tests given in the 3rd, 4th and 5th grades are shown in Figure 4.6. Fourth grade and 5th grade passing rates goals were exceeded: 91% of 4th grade students and 94% of 5th grade students achieved a passing rate. Passing rate goals for 3rd grade students improved but the goal was not reached, 79% of 3rd grade students passed; two percentage points below the goal of 81%.

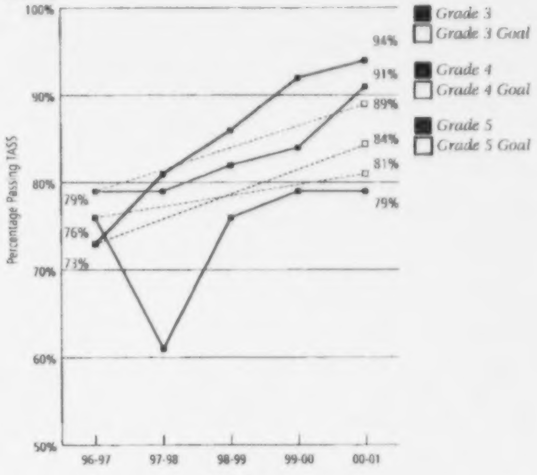
GOAL 2: Policies and practices will be enacted, so that 50% of district eighth graders will be enrolled in Algebra I and all students will be enrolled by the end of the 9th grade.

Algebra I enrollment and completion are shown in Table 4.5. The goal of 50% of the district's 8th graders enrolled in Algebra I was not reached. In SY 2000-01, 36.8% of LISD's 8th graders were enrolled in Algebra I. Enrollment peaked in SY 1999-00, with 38.1% of the total 8th grade population enrolled. The passing rate was 88.9% in SY 2000-01.

The goal of 100% of all students being enrolled in Algebra I by the end of 9th grade was also not met. For the purpose of this analysis, students were grouped into cohorts identified by the SY during which they were in 9th grade. The percentage of students completing Algebra I by the end of 9th grade remained relatively stable for three of the four years of available data with a 10.9 percentage point (pp) decrease for the 2000-01 cohort.

Figure 4.6

Percentage of Students Passing Mathematics TAAS



Grade Level	96-97 (Baseline)	97-98	98-99	99-00	00-01	00-01 Goals
3	76%	61%	76%	79%	79%	81%
4	79%	79%	82%	84%	91%	89%
5	73%	81%	86%	92%	94%	84%

Source: 2000-2001 LISD Evaluation Report

Table 4.5

Algebra I Enrollment and Completion in 8th Grade

	SY	96-97		97-98		98-99		99-00		00-01	
	A: Total G 8 Population	1,558	%	1,595	%	1,528	%	1,584	%	1,678	%
Algebra I	B: Enrollment (B/A)	261	16.7%	388	24.3%	452	29.5%	605	38.1%	619	36.8%
	C: Passing (C/B)	238	15.3%	344	21.6%	408	26.7%	548	34.6%	550	32.8%

Table 4.6

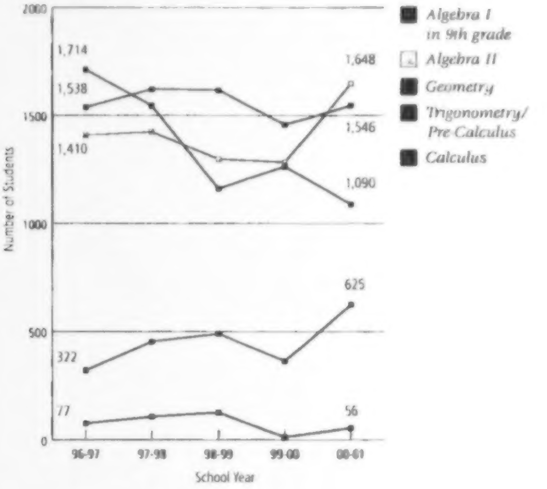
Algebra I Enrollment by the End of 9th Grade

	97 98	98-99	99-00	00 01
Number of students who enrolled in Algebra I in 8th Grade (previous year)	261	388	452	605
Number of students enrolled in 9th grade in Algebra I	1,547	1,163	1,265	1,090
Total enrollment in Algebra I by the end of 9th grade	1,808	1,551	1,717	1,695
Total 9th grade student population	2,130	1,891	2,031	2,290
Percentage of students enrolled in Algebra I by the end of 9th grade	84.9%	82.0%	84.5%	74.0%

GOAL 3: By the fifth year of the agreement, LISD agrees to double the number of high school students who enroll in SEM courses (e.g., Chemistry I, and/or Physics and/or AP science, geometry, or integrated mathematics I, Pre-calculus I). The exception to doubling is any course that presently has an enrollment total which is greater than half of the students in a grade level.

Figure 4.7

9th -12th Grade Mathematics Enrollment Trends by Subject: All Students



Based on data collected in TISC 2002, this goal was not applicable to several courses because enrollment in the baseline year was greater than half of the students in the grade level who typically took that course. The goal of doubling enrollment for Trigonometry/Pre-Calculus from baseline levels was almost met. Trigonometry/Pre-Calculus enrollment increased from 322 to 625; an increase of 94%. The results for Calculus enrollment were disappointing; enrollment in calculus fell from 77 to 56, a 27% decrease from the baseline year.

Although no specific quantitative goals were set for enrollment in Algebra I, Algebra II, and Geometry, an increase would be indicative of progress. For Algebra I in 9th grade, there was a drop in enrollment from 1,714 in SY 1996-97 to 1,090 in SY 2000-01. However, as previously discussed, there was an increase in Algebra I enrollment in the 8th grade through 2000-01, indicating that the decrease in 9th grade Algebra I enrollment is partially attributed to the increase in Algebra I enrollment in 8th grade.

Geometry enrollment remained stable from 1,538 students in SY 1996-97 to 1,546 students in SY 2000-01. Algebra II enrollment increased during this time period from 1,410 students in SY 1996-97 to 1,648 students in SY 2000-01, a 17% increase

Similar to mathematics, data collected in TISC 2002 indicate that the goal of doubling enrollment in several science courses was not applicable as enrollment was greater than half of the students in the grade level who typically took that course. Physics enrollment increased

SY	96-97	97-98	98-99	99-00	00-01
Algebra I in 9th grade	1,714	1,547	1,163	1,265	1,090
Algebra II	1,410	1,426	1,300	1,285	1,648
Geometry	1,538	1,623	1,618	1,458	1,546
Trigonometry/Pre-Calculus	322	455	491	365	625*1
Calculus	77	108	127	13	56*2
Mathematics Total	5,061	5,159	4,699	4,386	4,965

*1 Goal: 644 *2 Goal: 154

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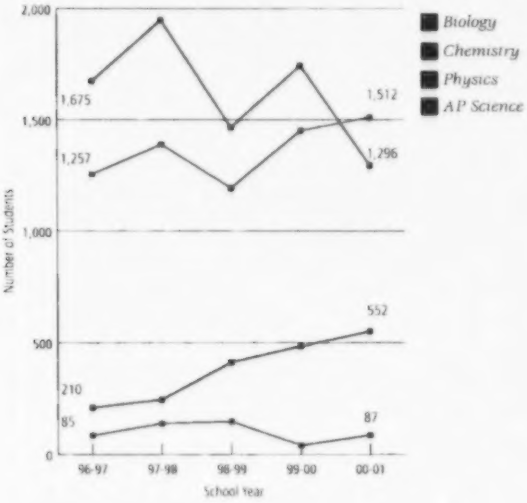
from 210 in SY 1996-97 to 552 in SY 2000-01, representing a 162% increase. Thus, the goal of doubling its enrollment from the baseline year was achieved.

Biology and Chemistry enrollment both changed over the five-year period. Biology enrollment in SY 1996-97 was 1,675 students and dropped sharply in SY 2000-01 to 1,296 students, a 23% drop. Over the same time Chemistry enrollment increased from 1,257 students in SY 1996-97 to 1,512 students in SY 2000-01, a 20% increase.

Figure 4.8

Science Course Enrollment Trends By Subject



SY	96-97	97-98	98-99	99-00	00-01
Biology	1,675	1,949	1,466	1,743	1,296
Chemistry	1,257	1,390	1,194	1,452	1,512
Physics	210	246	413	485	552[*1]
AP Science	85	139	148	41	87
Science Total	3,227	3,724	3,221	3,721	3,447

[*1] Goal: 420

GOAL 4: The number of students who in the baseline year, SY 1996-97 successfully complete (grade C or above) Gate-Keeping courses will increase by more than 100% within five years (SY 2001-02).

The specific timeline is as follows: LISD projected a 10% increase from the baseline year during Year 1 (1997-98), a 30% increase from the baseline during Year 2 (1998-99), a 50% increase from the baseline during Year 3 (1999-00), a 70% increase from the baseline for Year 4 (2000-01) and a 100% increase from the baseline by Year 5 (2001-02).

Gate-keeping courses are defined as those that prepare students for advanced learning and coursework in mathematics and science. For the purposes of this case story, the following are gate-keeping courses for mathematics: Algebra I & II, Geometry, Trigonometry/Pre-Calculus, and Calculus. Figure 4.9 shows completion data for these courses.

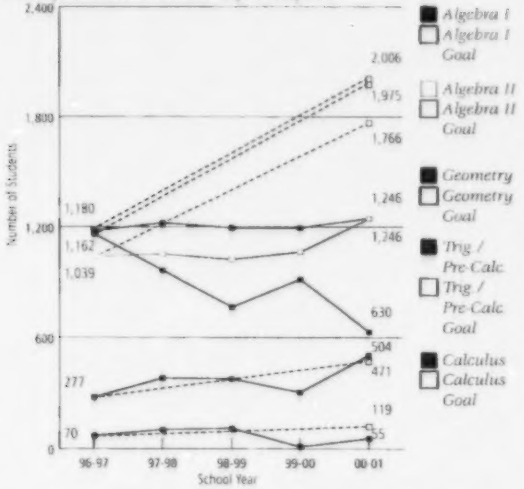
The number of students successfully completing Algebra I decreased from 1,162 in SY 1996-97 to 630 in SY 2000-01, failing to meet their 70% goal of 1,975 students. As noted earlier, this is partly attributed to the increase in Algebra I in 8th grade. Algebra II had an increase in successful completions from 1,039 students in SY 1996-97 to 1,246 in SY 2000-01, but still fell short of their 70% goal of 1,766 students. Geometry, which increased from 1,180 students in SY 1996-97 to 1,246 in SY 2000-01, failed to obtain the projected goal of 2,006 students. Completion for Trigonometry/Pre-Calculus rose from 277 in SY 96-97 to 504 in SY 2000-01. Thus, the four-year goal of 471 (based on the 70% projected increase) was exceeded. The goal for Calculus completions was projected to be 119 students, but this was not met as the number of students completing Calculus decreased from 70 in SY 1996-97 to 55 in SY 2000-01.

Science Gate-Keeping courses are identified as follows: Biology 1, Chemistry 1, and Physics. Biology completion decreased from 1,273 students in SY 1996-97 to 934 students in SY 2000-01, falling short of the projected goal of 2,164 students. Chemistry completion increased from 1,092 students in 1996-97 to 1,226 students in SY 2000-01, but it was not enough to attain the projected goal of 1,856 students. The Physics completion goal for SY 2000-01 was 304. This goal was exceeded; Physics completions more than doubled from SY 1996-97 (179) to SY 2001-02 (472).

In addition to the quantitative goals established in the cooperative agreement, several complementary quantitative goals were created for LISD student achievement, primarily in the area of preparedness for post-secondary education. These goals were drawn from Project TEAMS' annual reports to NSF. In this section, college entrance exam results are also presented.

Figure 4.9

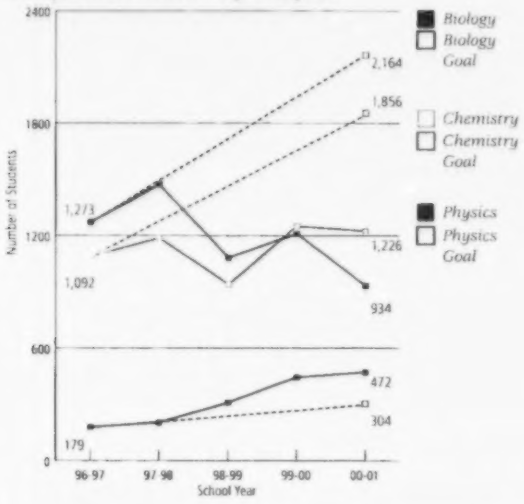
Mathematics Gate-Keeping Courses Completion Trends by Subject



SY	96-97	97-98	98-99	99-00	00-01	4-year Goal (70% increase)
Algebra I	1,162	964	765	916	630	1,975
Algebra II	1,039	1,052	1,023	1,064	1,246	1,766
Geometry	1,180	1,221	1,195	1,195	1,246	2,006
Trig./Pre-Calc	277	381	377	304	504	471
Calculus	70	103	110	11	55	119

Table 4.10

Science Gate-Keeping Courses Completion Trends by Subject



SY	96-97	97-98	98-99	99-00	00-01	4-year Goal (70% increase)
Biology	1,273	1,474	1,084	1,211	934	2,164
Chemistry	1,092	1,189	941	1,252	1,226	1,856
Physics	179	203	309	445	472	304

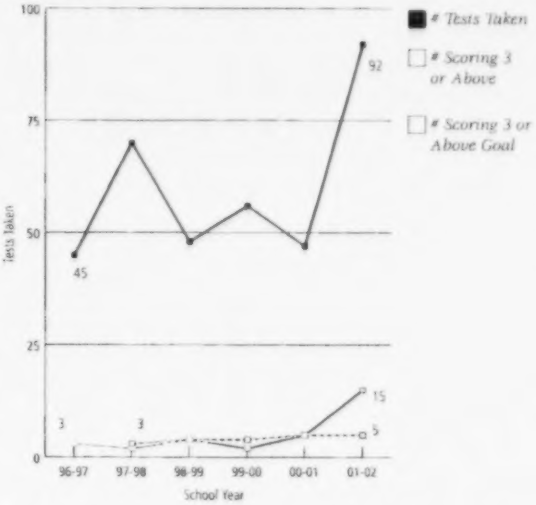
GOAL 5: The number of students enrolling in advanced placement science and mathematics courses will increase 60% from the baseline year. The number of students scoring a three or above on AP tests will increase by 60% from the baseline year.

Source: LISD Annual Report: Year 3 (1999-00)

Data were not available for the number of students enrolling in Advanced Placement courses. An alternative measure is the number of AP tests taken. In SY 1996-97, 45 students took an AP Mathematics exam, three of whom earned a score of 3 or above. In SY 2001-02, 92 students took an AP Mathematics exam; 15 students scored a three or above on the exam. The goal of a 60% baseline increase of students scoring a three or above on AP was exceeded for mathematics, as the increase from 3 to 15 represents a 400% increase.

Figure 4.11

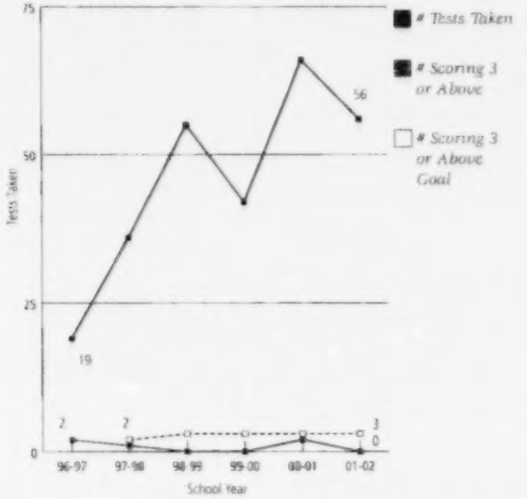
AP Mathematics: Total Number of Tests Taken



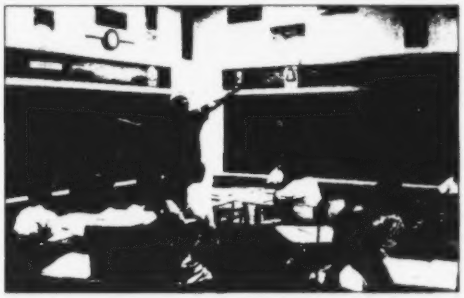
SY	96-97	97-98	98-99	99-00	00-01	01-02
Total Number of 11th and 12th graders	2,706	2,761	2,557	2,431	2,545	2,376
AP Mathematics Tests Taken	45	70	48	56	47	92
Tests Taken per 1,000 Students	16.6	25.4	18.8	23.0	18.5	38.7
Students Scoring 3 or Above	3	2	4	2	5	15
Goal for Students Scoring 3 or Above	•	3	4	4	5	5

In SY 1996-97, 19 students took an AP Science exam, two of whom earned a score of 3 or above. In SY 2001-02, 56 students took an AP Science exam; the number of students who scored three or above on the exam decreased from two to zero. The goal to increase the number of students scoring 3 or above was not met.

Figure 4.12
AP Science:
Total Number of Tests Taken



SY	96-97	97-98	98-99	99-00	00-01	01-02
Total Number of 11th and 12th graders	2,706	2,761	2,557	2,431	2,545	2,376
AP Science Tests Taken	19	36	55	42	66	56
Tests Taken per 1,000 Students	7.0	13.0	21.5	17.3	25.9	23.6
Students Scoring 3 or Above	2	1	0	0	2	0
Goal for Students Scoring 3 or Above	•	2	3	3	3	3



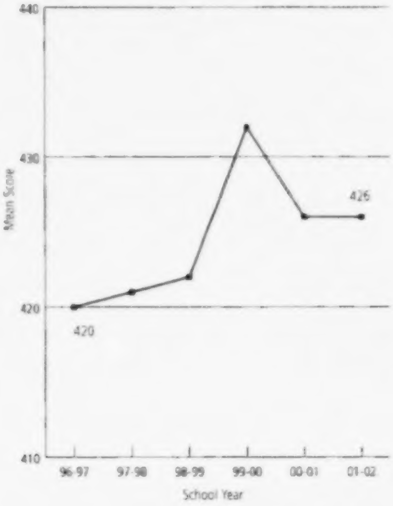
SAT AND ACT RESULTS

GOAL 6: Increase the number of students taking college entrance exams and scoring at least 1,000 on the SAT (Scholastic Aptitude Test) and/or 26 on the ACT (American College Test).
Source: LISD Annual Report: Year 3 (1999-00)

Although no specific quantitative goals were outlined in the initial cooperative agreement for either the SAT or ACT, subsequent annual reports set 1,000 as a benchmark score for the SAT and 26 as the benchmark score for the ACT. Frequency data for scores were not available for either the SAT or ACT. However, analysis of the mean scores and the number of test takers per grade can indicate trends in the district.

The raw number of test takers remained relatively stable; however, the overall 12th grade enrollment dropped from the baseline year. Analysis of the number of test-takers per 1,000 students indicates an increase in the proportion taking the SAT, from 182 per 1,000 students in SY 1996-97 to 232 per 1,000 in SY 2000-01. The mathematics SAT mean score remained relatively unchanged from 420 in the baseline year to 426 in SY 2000-01.

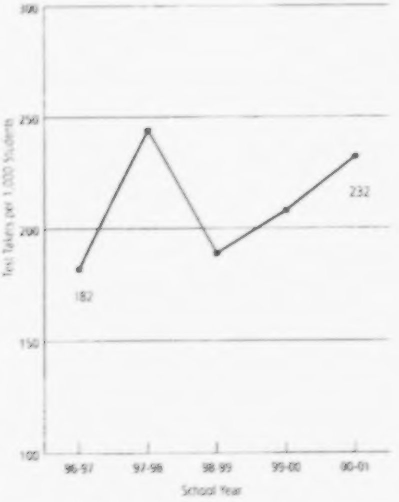
Figure 4.13
SAT Mathematics Mean Scores



SY	96-97	97-98	98-99	99-00	00-01	01-02
Mathematics	420	421	422	432	426	426

Figure 4.14

SAT Mathematics Test-Takers per 1,000 Students

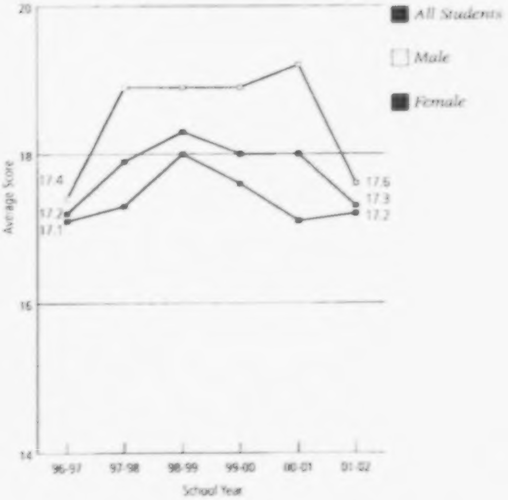


SY	96-97	97-98	98-99	99-00	00-01
Total Number of 12th Grade Students	1,408	1,399	1,388	1,234	1,134
Test-Takers	256	342	262	257	263
Number of Test-Takers per 1,000 Students	182	244	189	208	232

A similar approach was taken for evaluating the ACT scores for LISD. In SY 1996-97, 142 students per 1,000 students took the test and 126 per 1,000 students took the test in SY 2001-02. The goal to increase the number of students scoring at least 26 was unable to be measured since only mean scores were available. LISD ACT scores remained relatively unchanged with an average score of 17.2 in SY 1996-97 and 17.3 in SY 2001-02.

Table 4.15

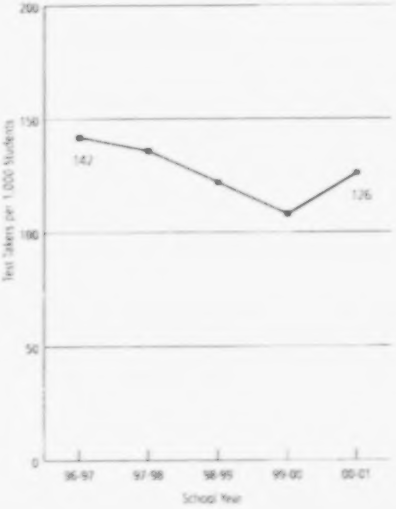
ACT Average Scores by Gender



SY	96-97	97-98	98-99	99-00	00-01	01-02
All Students	17.2	17.9	18.3	18.0	18.0	17.3
Male	17.4	18.9	18.9	18.9	19.2	17.6
Female	17.1	17.3	18.0	17.6	17.1	17.2

Table 4.16

ACT Test-Takers



SY	96-97	97-98	98-99	99-00	00-01	01-02
Total # of 12th Grade Students	1,408	1,399	1,388	1,234	1,134	n.a
Test-Takers	300	190	169	133	143	189
# of Test-Takers per 1,000 Students	142	136	122	108	126	n.a

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CONCLUSION

Project TEAMS has had substantial and far-reaching effects on LISD's science and mathematics reform efforts. Project TEAMS' impact reached across all reform areas including curriculum, instruction, assessment, policy formation, the development of partnerships, and professional development practices. LISD administrators and teachers were unified in crediting the CPMSA initiative as being a driving force in "raising standards" across all of these reform areas.

Progress in curriculum reform was achieved in several areas, principally in implementing and monitoring standards based curriculum, assessment, and instruction. During SY 1999-00, mathematics and science curriculum standards based on the state-mandated Texas Essential Knowledge and Skills (TEKS) were created and distributed to PK-12 teachers. Additionally, new articulated course materials (e.g., FOSS, Connected Mathematics) and teaching strategies were put into practice across the district.

Two primary changes were made to the way district policies were created. First, all policy decisions are now based heavily on data. A framework for the disaggregation of assessment data was developed and procedures were created to ensure that this framework served to assist in the review and development of polices. By adopting a more "data driven" system, proposed initiatives considered for implementation are now evaluated to ensure that they are founded on research-based principles and include an assessment component. Second, LISD integrated a standard of accountability for all activity related to student expectations, curriculum implementation, and instructional practices. LISD's reform goals were assigned to a team comprised of members of the superintendent's cabinet. Each team planned an implementation strategy for its goal. At the conclusion of the efforts the team met with the superintendent for formative and summative evaluations.

By SY 2000-01, the development of partnerships with community members/organizations, business/industry, and institutions of higher education has resulted in over 10,000 students being impacted. Partnerships and resource convergence have also been able to supplement mathematics and science LISD reform efforts by providing funds, students support programs through contributions of personnel (e.g., tutors, mentors, instructors), resources, publicity, and internships aimed at improving the quality of instruction and student achievement.

Professional development practices were also reformed to create more rigorous standards for teachers, especially mathematics and science teachers. Beginning in SY 1999-2000, mathematics and science K-12 teachers were required to participate in 60 hours of professional development in standards-based content annually. In addition, all secondary mathematics and science master teachers and elementary peer coaches are required to participate in 100 hours of professional development yearly. From SY 1997-98 to SY 2000-01, the number of mathematics and science teachers who received professional development almost doubled.

"Raising academic standards" was also a critical mission for Project TEAMS. Success was evident in a number of areas. According to LISD, the work of Project TEAMS was a major influence on the implementation of the new, more rigorous graduation policy adopted in SY 1999-00. The new policy required students to complete an additional year of mathematics and science and only granted permission to students to graduate under the Minimum Plan as a final option in special circumstances.

The enacted policy yielded positive effects: from SY 1997-98 to SY 2000-01, LISD saw an increase in students graduating under the Recommended Program (57% to 61%) and Distinguished Achievement Plan (DAP) (.09% to 13%). The number of 12th graders graduating under the state's Recommended or DAP (74%) is well above the state average.

Most notably, student achievement data showed that there were improvements in performance in several areas. For example, data from the mathematics portion of the TAAS test indicated a higher percentage of 4th and 5th grade students were passing the test than before the CPMSA grant began. From SY 1996-97 to SY 2000-01, 3rd grade TAAS scores rose from 76% passing to 79% passing, 4th grade scores rose from 79% to 91%, and 5th grade scores rose from 73% to 94%.

While there was only a slight increase (8%) in 8th grade population from SY 1996-97 to SY 2000-01 there was a 137% increase in the number of 8th grade students enrolled in Algebra I, increasing from 261 students to 619. Of those 619 8th grade students enrolled in Algebra I in 8th grade during SY 2000-01, LISD demonstrated an 88.9% successful passing rate with 550 students.

Several student achievement goals were not met, however. LISD acknowledges the need for the hard work to continue beyond the CPMSA project. Also, the overall goal of improving English communication skills continues to be a challenge. Efforts were undertaken to help ease the difficulties that students experience as a result of poor English skills. Due to Laredo's rapidly growing student population this particular challenge is a formidable one. LISD recognizes this need and will build upon the lessons learned from Project TEAMS.

Classroom Observations at Buenos Aires Elementary School

The challenge of engaging young students in mathematics and science is a difficult one. *FOSS (Full Option Science System)* curriculum materials, funded by Project TEAMS, meets this challenge by incorporating hands-on inquiry and interdisciplinary projects to demonstrate the interrelatedness and relevance of scientific concepts. Contemporary methodologies such as multi-sensory observation and learning groups are key components of the FOSS approach.

At Buenos Aires Elementary School, instructors face an additional obstacle with the high proportion of LEP students; classes are taught primarily in English but instructors use Spanish to ensure that scientific and analytical concepts and terminology are fully comprehended.

During a 3rd grade class, observed students were learning about metric measurement. They learned to examine, calculate, contrast, and record length in centimeters, weight (mass) in grams, volume in milliliters and liters.

Building for the Future

Adriana Lombrana, the original Project TEAMS coordinator and a 16-year employee of Laredo Independent School District, now guides Buenos Aires Elementary School as Principal.

Buenos Aires Elementary School faces difficult challenges: a high population of low income and LEP students, a rapidly increasing student population (the Census Bureau reports that Laredo is the second fastest growing city in the country), and a significant amount of new building construction scheduled for the upcoming year are among the most immediate concerns. The school and district face these challenges with a strong and focused commitment that the progress that has been made will continue.

As stated by Ms. Lombrana, "This is all coming down. The whole school will be demolished next year and rebuilt to accommodate the increases. It will be difficult. Students will be in temporary arrangements for a year. However, we will do well."

Section V

ACHIEVING SYSTEMIC CHANGE IN MATH AND SCIENCE – OAKLAND UNIFIED SCHOOL DISTRICT CPMSA

IN 1997, THE OAKLAND Unified School District (OUSD) initiated mathematics and science educational reform through the Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA) program funded by the National Science Foundation (NSF). The program was designed to increase the achievement of all students, particularly underrepresented minority students, by implementing a standards-based mathematics and science K-12 curriculum, providing student support services, and improving instruction.

OUSD was awarded a $3.6 million five-year grant, *Achieving Systemic Change in Math and Science*, in October of 1997 and began implementation in April 1998 under the direction of Principal Investigator Superintendent Carolyn Getridge, and Co-principal Investigators, Mr. Terry Mazany, Associate Superintendent of Curriculum and Instruction, and Ms. Yolanda Peeks, Assistant Superintendent of Curriculum Standards and Professional Development. The Superintendent served as principal investigator until the summer of 1999. The Assistant Superintendent served as interim superintendent for a few months, followed by the City Manager of Oakland, while the district conducted a nation-wide search.

Between 1998 and March 2000, the Director of Science Programs in the Division of Curriculum and Instruction, Mr. Dale Koistinen, managed the CPMSA Project. Under his leadership, project implementation began with one high school and its feeder middle and elementary schools. Efforts began with aligning the curriculum with state and national standards, and cur-

A Profile of Oakland, California

Oakland, located in northern California, is the state's eighth largest city with a population of just under 400,000.

Oakland's ethnic makeup is very diverse, with no group making up more than 35% of the population. Approximately 34.7% of the population is Black. Whites are the second most populous ethnic group at approximately 23.5% of the population. Hispanics (21.9%), Asians (15.2%), multi-racial (4%), and American Indians/Alaskan Natives (0.7%) represent the rest of the population.

Oakland's median household income is $40,055, with the per capita at $21,936. The unemployment rate is approximately 5.1%.

Oakland is home to several institutions of higher learning, including California College of Arts & Crafts, Holy Names College, Laney College, Merritt College, Mills College, Samuel Merritt College, and San Francisco State University (Extended Learning). Also located in the city are the African American Museum & Library at Oakland, the Chabot Space & Science Center, the Oakland Museum, and the Oakland Zoo.

■ ***Oakland, CA***

Source: US Census Bureau 2000,
http://www.oaklandnet.com

riculum guides were developed to provide teachers with direction and valuable resources. A mathematics coordinator was hired in 1999 and mathematics coaches were assigned to schools with the greatest need.

In March of 2000, OUSD hired a new superintendent, Dr. Dennis Chaconas. Shortly after his appointment, he prepared a Recovery Plan in response to a negative state audit that had been conducted in early 2000. He then received a report from a February 2000 NSF site visit which addressed many of the same issues as the state audit in addition to placing the CPMSA grant at risk. In response to the NSF report, Dr. Chaconas integrated the CPMSA project with the Recovery Plan and the 2000-01 Strategic Plan (the annual implementation plan), directing all resources to support student achievement. The Recovery Plan was based on two basic tenets: 1) all children can meet high standards, and 2) every adult in the district is responsible and will be held accountable for high student achievement. Thereafter district staff referred to the Recovery Plan, rather than the CPMSA project, in identifying the reform initiative. The CPMSA project was utilized to lead the reform efforts in mathematics and science and was integrated into the district's curriculum and professional development initiatives.

Significant progress was made between March and June of 2000, providing the project with the needed focus for the remainder of the grant period. In particular, progress was made in aligning the curriculum with state standards and preparing corresponding curriculum guides, establishing an advisory committee comprised of partner representatives, and adopting a professional development model based on student performance and quality of instruction. As indicated by the Associate Superintendent Louise Waters, and the CPMSA Project Director, Kathleen Schuler, the implementation of the CPMSA project really began in 2000. During the period of 2000-2001, foundational work was laid that contributed to improved student achievement.

This case story is based on reports from frontline administrators, principals, and teachers that were recounted to the study team during a site visit in September 2002. Other source information was obtained from annual reports prepared for NSF by school district officials, the OUSD Strategic Plans for 2000-2001 and 2001-2002, the 1997-2000 Implementation Evaluation and the November 2000 Summative Evaluation reports, and Tabulated Indicators for Systemic Changes (TISC 2001), collected and compiled by Systemic Research, Inc. Particular attention is given to reform efforts during the period of 2000-2001.

OAKLAND UNIFIED SCHOOL DISTRICT DEMOGRAPHICS

The Oakland Unified School District is a minority majority system. In SY 2000-01, there were 54,795 students enrolled in 87 schools. Students were 46.7% African American, 28.7% Hispanic, 17.2% Asian/Pacific Islander, 5.6% White, 0.5% American Indian/Alaskan Natives, and 1.3% other. In addition to the traditional schools, OUSD included one small school 6th grade academy, two small school 8th grade academies, seven comprehensive high schools (including one small school), nine alternative education centers, and an independent studies program. More than 35% of the students were English Language Learners and spoke one or more of 80 languages and dialects. Fifty-five percent of Oakland students qualified for free or reduced lunch and 48% received Aid to Families with Dependent Children (exceeding 90% in some schools).

Oakland Unified School District: Facts in Brief (SY 2000-01)

Total Students: 54,795
American Indian: 0.5%
Asian/Pacific Islander: 17.2%
Black (Not Hispanic): 46.7%
Hispanic: 28.7%
White (Not Hispanic): 5.6%

Male: 51% Female: 49%

Students Enrolled in:
Elementary Schools: 55%
Middle Schools: 23%
High Schools: 22%
Ungraded Schools: 0%

Schools: Total 87
Elementary Schools: 60
Middle Schools: 15
High Schools: 11
Ungraded Schools: 1

Mathematics and Science Teachers: Total 2,015
Elementary School Teachers: 1,595
Middle School Mathematics Teachers: 134
High School Mathematics Teachers: 83
Middle School Science Teachers: 135
High School Science Teachers: 68

Selected Key Indicators
Special Education: 8.5%
Limited English Proficient Students: 35.3%
Free and Reduced Lunch Students: 55.0%
Daily Average Attendance: 91.0%
Average Retained: 6.8%
Mobility: 29.0%

Sources:
- *Tabulated Indicators for Systemic Change (TISC 2002)*, Systemic Research, Inc.
- Core Data Elements, 2001, Westat, Inc.

Small Schools

Research has demonstrated that school size is a major factor in student academic success. Small autonomous schools significantly improve the education and achievement of urban students, particularly students of color and low-income students.

Oakland Unified School District created a network of small autonomous schools- schools of choice for parents, students and teachers.

Source: http://209.77.220.25/ousdinternet/news/revised%5Fnsa%5F%20policy.htm

According to the Project Director, the CPMSA project included grades K-12, with a special focus on secondary schools during the last two years of the grant period (2000-02) since the elementary schools were engaged in the implementation of Open Court, the district's literacy curriculum. Under Superintendent Chaconas' Recovery Plan, all schools were included in the reform efforts and all students were served.

During SY 2000-2001, 48 schools were identified as low performing and therefore qualified for additional state funding. They received district support in addition to grant support.

CPMSA IMPLEMENTATION DURING 1997-2000

Over a period of the three years prior to 1997, OUSD invested its efforts and resources in laying the groundwork for reform. Through extensive research the district gained a profound understanding of the elements required for successful reform in a large, high-poverty urban district. They learned that short-term, fragmented efforts did not impact the problems most urban school systems face; rather, they had to commit to a long-term change process that was built on a constructivist pedagogy and rigorous content. Based on the research findings, the district sought to achieve systemic reform and create a culture of inquiry by implementing a standards-based curriculum, strengthening instructional leadership, establishing timely interventions and student support systems, monitoring student performance, and converging all resources into the reform effort.

According to the Oakland Unified School District's original proposal to NSF, the CPMSA project set the following goals:

1. Double the number of minority students who enroll in Algebra in grade 9 by Year 5
2. Double the number of minority students who successfully complete the college preparatory A-F course sequence [A-G were the University of California entrance requirements] and are prepared to enter college by Year 5
3. Increase by 10% the number of students who take the SAT; improve mathematics scores by 10%
4. Increase average performance on the new standardized tests by 5 percentile points
5. Increase participation of minority students in AP mathematics and science classes by 100%

During 1997-2000 the CPMSA project supported the district's efforts in providing teachers with training and resources to improve the quality of K-12 mathematics and science instruction. Toward that goal, CPMSA implemented several activities, including: 1) establishing or revising policies targeting student achievement, 2) developing standards for mathematics and science with corresponding curriculum guides, and 3) offering a range of professional development activities targeting mathematics and science teaching.

The July 2000 Implementation Evaluation of the District's CPMSA project (1997-2000), conducted by the OUSD Department of Research and Evaluation, indicated that while significant efforts were made during

1997-2000, the level of implementation of most activities was poor. According to the evaluation report, CPMSA lacked a clear vision of reform and its communication and leadership systems were not well implemented. Professional development, which was a major reform strategy for transforming teaching and learning of mathematics and science, was also poorly implemented. Workshops were one-time events and reached the same teachers. In-service training had low rates of participation and lacked clear goals and expectations. In addition, new teachers were not adequately targeted. Student and family support programs were lacking and there was a weak system for collecting, maintaining and utilizing data to monitor implementation, measure outcomes, and guide program planning.

University of California Entrance Requirements

The **A-G course sequence** are requirements for admission into the University of California system. These requirements are more stringent than the typical California high school graduation requirements.

Each letter stands for a subject as follows:

A. History / Social Science -Two years required, including one year of U.S. history or one-half year of U.S. history and one-half year of civics or American Government; and one year of world history, cultures, and geography
B. English -Four years of college preparatory English that include frequent and regular writing, and reading of classic and modern literature
C. Mathematics - Three years of college preparatory mathematics that include the topics covered in elementary and advanced algebra and two- and three-dimensional geometry
D. Laboratory Science -Two years of laboratory science in at least two of these three disciplines: biology chemistry, and physics
E. Language other than English - Two years of the same language other than English
F. Visual & Performing Arts - One year, including dance, drama/theater, music, and/or visual art
G. College Preparatory Elective -one year of college preparatory electives are required

Source: http://pathstat1.ucop.edu/ag/a-g/a-f_reqs.html

The evaluation report provided recommendations for effectively implementing the CPMSA project. In summary, it recommended that CPMSA staff:

- Establish buy-in from the Board of Education, Central Office departments, school sites, parents, and the community
- Define its role within the district's reorganization and clarify its responsibilities in implementing Year 4 activities
- Fully implement the professional development model with activities that are based on evaluation findings and teacher needs
- Continue the process of curriculum alignment and training around standards
- Facilitate a K-12 assessment system
- Conduct an assessment of existing student support programs and complete an intervention plan for students, especially for Algebra and secondary science courses

The evaluation report additionally recommended that the District establish policies for professional development, a system for on-going revisions of curricular standards with appropriate modifications, and allocation of resources to establish and operate the Resource Center.

In November 2000 the OUSD Department of Research and Evaluation K-12 Mathematics and Science Achievement Summative Evaluation of the CPMSA project reported low project implementation similar to the findings presented in the July 2000 Implementation Evaluation report. Student outcomes for mathematics and science had not improved during the first three years of the initiative. Results for African American and Hispanic students, who comprised 75% of the district's student population, declined over the same period, thus widening the achievement gap. Students evidenced high rates of failure in high school gate-keeping courses, especially in 9th grade Algebra (only 32.9% of students passed with a C or better). While the number of students enrolled in upper level mathematics and science courses increased as a result of district policies, efforts were not effective in helping students successfully complete the courses. In elementary schools, students taught by teachers participating in Math Matters were performing at higher levels of mathematics only in the classrooms where teachers were implementing what they had learned to a high degree.

The November 2000 evaluation report also provided recommendations for more effective implementation. In summary, it recommended that CPMSA:

- Provide resources and interventions for improving student achievement in gate-keeping and upper-level courses
- Focus professional development not only on developing instructional capacity, but also on equity issues around mathematics and science achievement
- Provide student support services to help students meet graduation requirements and become better prepared for college
- Develop a K-12 science assessment system, to monitor program effects on student achievement
- Investigate implementation and outcomes of the Math Matters program

Math Matters

Math Matters is an elementary school teacher mathematics professional development program that served twenty of the lowest performing schools. Supported by the Department of Education, the program provided on-going site-based coaching in content, pedagogy, and classroom management.

Math Matters offered 82 hours of workshops and Summer Institutes plus weekly coaching. 48 teachers participated in in-services, taking a total of 639 hours for an average of 13.3 hours per teacher. The range of hours taken ranged from a low of 4 hours to a high of 34 hours. Math Matters Teachers on Special Assignment (TSA) coached 141 teachers for an average of 1 hour each every one to two weeks.

Source: 1999-00 Annual Report

The report additionally recommended that the district ensure course standardization and assume responsibility for assessments of the Algebra readiness test and other secondary mathematics course exams.

The district undertook a diagnostic process of identifying strategies to affect improved student achievement, and a new strategic plan was developed and implemented. The CPMSA Strategic Plan for 2000-01 was in line with the Superintendent's goals in his Recovery plan.

THE CPMSA STRATEGIC PLAN

To address the concerns about poor CPMSA implementation during the first three years, the 2000-01 strategic plan was developed in accordance with the superintendent's Recovery Plan. Table 1 compares the CPMSA Strategic Plan goals to those of the Recovery Plan.

All schools were given annual targets for improvement in student achievement and school climate based on the student goals outlined in the Recovery Plan and student performance at the site. The schools were held accountable for meeting those targets.

According to the Associate Superintendent, Ms. Waters, it was clear that the instructional capacity was weak. About one-third of the teachers (700 teachers in the spring of 2000) were on emergency credentials, indicating unacceptable educational backgrounds. The lack of literacy among students was another major issue that resulted in low student performance in mathematics and science. In addition, principals and teachers did not know how to use data to drive instruction.

Several measures were taken to address these issues. The OUSD developed partnerships with higher education institutions to provide teachers with professional development. The efforts in this area were highly successful; the number of teachers on emergency credentials decreased to 29 by September of 2002.

Shortly after his appointment, Superintendent Chaconas conducted a thorough research effort to assess the condition of every school in the district. Based upon results from school site reviews a large number of principals were terminated and others were placed on probation and assigned to Executive Directors. Executive Directors were appointed by the Superintendent to monitor, supervise, and evaluate principals. Additionally, principals received formal training in the use of data to drive instruction. They also received training in using resources and performing classroom/teacher observations.

Results of school reviews also indicated that a large number of students were not reading at grade level. Reading programs were established and teachers of grades 6-12 were released to receive training in the new reading programs. To address the needs of students in special education and those with limited English proficiency, the district focused primarily on literacy and academic English development during SY 2000-01. A major focus was also placed on improving literacy at the secondary level to support mathematics and science achievement.

The Department of Teaching and Learning, to which CPMSA made its major investments, and the Department of Accountability, were combined into the Department of Student Achievement in 2001. During SY 2000-01, the District began shifting to site-based management, with the Central Office moving from being a hierarchy to a service agency. To improve the communication and leadership system of CPMSA, the Project Director worked closely with the Superintendent and his cabinet to ensure effective implementation, record keeping, and reporting.

Beginning in the summer of 2000 OUSD required all schools, starting with the 48 lowest performing schools, to create a single comprehensive site plan that aligned all funding and programs with the school's primary goals. The plan was to address all curricular areas, including mathematics and science, and consolidate the separate plans developed for different state and federal programs into one site plan. In September 2000, the district required all schools to prepare data-driven site plans. The UCLA Center for Research on Evaluation, Standards and Student Testing (CRESST) adapted a CD-ROM based data system, the Quality School Profiles (QSP), for the district to provide school staff with ready access to student performance and school climate data. CPMSA staff led and participated in a series of site team seminars to train school staff in the use of QSP and to prepare the consolidated plans.

Table 5.1

2000-01 CPMSA Goals Compared to Superintendent Goals in the Recovery Plan

Goal Number	CPMSA Goals	Superintendent's Goals
1	Implement a comprehensive standards-based mathematics and science curriculum and/or instructional materials that are aligned with instruction and student assessment.	All students will achieve a rigorous, standards-based curriculum, and each school shall meet or exceed their annual targets for improvement.
2	Develop a coherent, consistent set of policies that support provisions of broad-based reform of mathematics and science at the K-12 level.	Develop a comprehensive, coherent program of reform that focuses all efforts and resources on increased student achievement across the curriculum.
3	Converge all resources that support mathematics and science education into a focused program that upgrades and continually improves the mathematics and science educational program.	Focus all resources on activities that directly result in improved student achievement.
4	Initiate broad-based support from parents, policymakers, institutions of higher education, business and industry, foundations, and other segments of the community.	Engage teachers, staff, families, and the community in school improvement through collaboration and effective dialog.
5	Accumulate a broad and deep array of evidence that the project is enhancing student achievement through a set of indices (annual student mathematics and science achievement test scores).	Develop a comprehensive, accessible data and assessment system to inform decision-making and to provide timely evidence of student achievement.
6	Improve the achievement of all students, including those historically underserved, as evidenced by progressive increments in student performance.	Improve the achievement of all students.

Source: OUSD CPMSA Strategic Plan for 2000-01

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Mathematics and Science Curriculum and Instruction

OUSD began aligning its mathematics and science core curriculum with the national standards and California's curriculum frameworks in 1996. Between 1996 and 1998, the district made significant progress in aligning the elementary grades' instructional program, 9th grade physical science, and 10th grade biology. The process of curriculum alignment continued during the CPMSA grant period culminating in the preparation of curriculum guides for science in SY 1999-00 and for mathematics in SY 2000-01, as well as the adoption of new textbooks in SY 2001-02. The K-12 mathematics and science curricula was also aligned with the A-G entrance requirements for the University of California (UC). The A-G designation refers to specific requirements for each subject matter, with C being the mathematics requirements and D being the science requirements. Each high school was required to offer at least AP Calculus and all core courses to meet the UC entrance requirements. In SY 1999-00, graduation requirements increased from two years to three years each of high school mathematics and laboratory science.

As part of CPMSA implementation, the district adopted the *Algebra for All* policy in 1998, requiring all students to take Algebra by the 9th grade beginning in 1999-00, with the goal of all students taking Algebra in the 8th grade by 2004. However, pass rates declined (62% in 8th grade and 33% in 9th grade Algebra I in SY 2000-01, compared to 82% and 62% in SY 1996-97) as enrollment increased. An assessment of the *Algebra for All* policy by Gibson and Associates, a private firm located in Oakland providing planning, research, and evaluation services, in September 2001 indicated that while the curriculum itself was rigorous, phases of implementation were inconsistent. Based on the assessment findings, the District developed a K-12 master plan for mathematics. The plan called for standards-based textbooks, publishing the curriculum guides, intensive professional development, the creation of standards-based benchmark assessments, and timely student interventions.

The mathematics course sequence remained the same during CPMSA implementation, with Introduction to Algebra and Geometry offered in 7th grade, Algebra or Pre-Algebra in 8th grade, Algebra I or Geometry in 9th grade, Geometry or Intermediate Algebra or Advanced Algebra electives in 10th grade, Advanced Algebra and Trigonometry electives in 11th grade, and Mathematics Analysis or Calculus electives in 12th grade. New textbooks (Harcourt), adopted in 2001 and 2002, were aligned with the state standards. Curriculum guides were developed around the standards by the mathematics coordinator as a supplement to the textbooks.

Beginning with SY 2000-01, a full year of science was required in grades 6-8, and two years of laboratory science were required in grades 9-12; biology and chemistry or physics. A full year of science was offered in all three middle grades for the first time in 2000-01. The district also adopted new science textbooks that were aligned with the state standards, with curriculum guides developed around the standards to support the teachers. The elementary hands-on, inquiry-based science program was built around the Full Options Science System (FOSS) curriculum materials, with FOSS kits available at the Science and Mathematics Activities and Resources for Teachers (SMART) Resource Center. The SMART Center provided teachers and students with the tools needed for inquiry mathematics and science. The original Resource Center was renamed the SMART Center in May 2001 and moved to the newly renovated facilities at the old Chabot Observatory site. The new Center increased the number of FOSS kits, refurbished the old kits, and continually added new resources.

While the district followed a rigorous mathematics and science curriculum, there was no system to monitor implementation or student learning prior to 2000-01. With the implementation of the QSP data system and site-based professional development, progress was made in differentiated instruction to meet the needs of all students. One of the major challenges faced was the belief system at the school level. According to an executive director, many teachers had the "my students can't do it" attitude. The executive director worked closely with each of his/her assigned schools to monitor principals, individual student progress, and support activities. Schools were held accountable for the first time. Copies of the standards were given to each teacher in the executive director's cluster. Emphasis was placed on purposeful, standards-based instruction and keeping the best interest of the student in mind.

Science and Mathematics Activities and Resources for Teachers (SMART) Resource Center

Oakland Unified School District has adopted standards-based science and mathematics curricula designed to provide a meaningful education for all students and to prepare them for life in the 21st century. The curricula give students the opportunity to:

- Explore
- Investigate
- Inquire
- Question
- Test Hypotheses
- Collect & Analyze Data

Students learn to apply the "big ideas" of math and science. Students develop a deep understanding of math and science by doing rather than memorizing facts.

The SMART Center gives teachers and students the tools they need to do inquiry science and mathematics:

- FOSS Science kits
- AIMS & GEMS Guides
- Science literature
- Mathematics manipulatives
- Science aids & videos

In May 2001 the BASTEC Resource Center was re-named the SMART Center and moved to its newly renovated facilities at the old Chabot Observatory site. With support from a National Science Foundation grant the SMART Center has expanded its services:

- A centralized repository for math and science materials located in a teacher-friendly location.
- Refurbishment of FOSS science kits and other resource materials.
- Timely pick-up and delivery to your school thanks to Lawrence Berkeley National Laboratory.
- Support for teachers in the use of FOSS kits and other hands-on materials.
- Two SMART Center Professional Development Classrooms.

Reprinted from: http://tlc.ousd.k12.ca.us/nsf/doc/brochure.pdf.

The OUSD administered the Stanford Achievement Test (SAT-9), the required state assessment, each spring in grades two through eleven for mathematics and grades nine through eleven in science. Assessment was embedded in the FOSS program, but data were not collected by the sites or the district. The Preliminary Scholastic Assessment Test (PSAT) for 8th graders became a requirement in SY 2001-02. Other standards-based assessments included the Algebra Readiness Exam and other optional mathematics assessments. Prior to SY 2000-01, only central office programming staff could access these data. With the adoption of the QSP data system, schools were able to access and query a disaggregated database on multiple measures of achievement of their respective students.

In 2000, the district selected the North West Evaluation Associates (NWEA) norm referenced, web-based Measures of Academic Progress (MAP) for reading, writing, and mathematics. The program was piloted in 2001-2002 with the 850 students in the Rising 9 Summer Bridge, a program for rising 9th graders designed to prepare them for high school. In addition, the Standards in Practice (SIP) professional development model provided another source of data for assessing student learning through comparing the actual work students did to the rigor of the assignments given. A team based process is used to align student assignments to the curriculum standards. SIP is a professional development collaboration between OUSD and the Education Trust.

The district's entire reform initiative was standards-based. During 2000-01, much effort was devoted to aligning curriculum, instruction, assessment, and professional development with the standards and with each other. The SIP model, along with the QSP and MAP tools, provided the vehicle for teachers and site administrators to use student work and data to improve instructional practices in the classroom.

The OUSD Board of Education focused its efforts on improved student performance. Board members supported Superintendent Chaconas in making the necessary personnel changes toward that goal and allocated the necessary resources to improve curriculum and instruction. According to Mr. Bruce Kariya, a board member who had served for four years (1998-2001), increasing student literacy was a major thrust. Improved literacy was a major factor in test score gains and in reducing special education student designations, particularly among the African American population. District reform efforts began with a focus on elementary school literacy. During SY 2002-03, the district-wide focus began shifting to mathematics.

Student Support/Enrichment Programs

Developing a support system for students who were under-achieving in mathematics and science was a major goal of CPMSA; however, it was not addressed in the first three years of the grant period. According to the 2000-01 Annual Report, many support programs were provided but there was no documentation of what programs were offered, and there was no coordination among the various programs and the district sites. Furthermore, there was no system to match student needs with programs or to monitor resulting student progress.

Beginning in 2000-01, efforts were made to coordinate existing services, strengthen academic interventions, place students in appropriate programs, and monitor impact. Student support services were identified through the Consortium of After-School Service Providers. The Consortium of After-School Service Providers are a group of service providers that meet to discuss issues relevant to them; members include the Chabot Space and Science Center, California State University Hayward, and Mills College. Beginning in the spring of 2001, all secondary schools were required to develop a short-term intervention plan to address gaps in student achievement as identified by QSP and the first grading period. They were required to provide in-school and after-school tutoring and Saturday Schools at least twice a month. However, progress was slow in ensuring appropriate, timely student interventions at each site and monitoring the impact of that intervention. According to the 2000-01 Annual Report, the District appointed a full-time SummerPrep (the summer school program that had been the primary intervention for failing Oakland students) and Student Interventions Coordinator in the fall of 2001 to address this need.

The district additionally implemented the Small Learning Community/Small Autonomous Schools policy approved by the Board. This concept was initiated by parents, who formed "think tanks" with teachers and high school students. In 2000-01, all high schools developed plans to implement small learning communities for entering 9th graders and six new small schools were established. Small learning communities were designed to address 9th grade student needs in over-crowded schools. They were physically contained in the schools and had a high degree of autonomy, with heterogeneous student groupings and separate teachers assigned to reduce the student-teacher ratio. According to the Assistant Superintended of School Reform, Dr. Jose Martinez, these schools showed good success.

Professional Development

Surveys conducted by CPMSA staff in late spring of 2000 indicated that the majority of teachers and principals had received the standards for mathematics and science, and a slightly smaller percentage reported having a good understanding of them. However, the *Algebra for All* assessment and classroom observations conducted by principals did not support the contention that teachers understood the standards or were using standards based lessons in their classrooms. According to the 2000-01 Annual Report, CPMSA research conducted during years three and four of project implementation indicated that traditional professional development (i.e., off-site workshops and stand-alone institutes) had very little impact on teachers' instructional practices. The research further indicated that most teachers did not have sufficient mastery of content and needed site/work-based professional training.

In response to these findings, CPMSA and a Title IV grant (federal financial aid) funded the Standards in Practice (SIP) professional development model that engaged site teams of teachers and administrators in structured, collegial examinations of the quality of student assignments and the resulting student work. SIP changed the professional development paradigm from coaching and workshops focused on individual teachers to a school based model. The purpose was to build teacher leadership, strengthen instructional practices, and identify professional development needs. OUSD contracted with Education Trust, a nonprofit advocacy group, to conduct the training and assist with implementation. The SIP model was implemented in grades 6-12 in the fall of 2002, after training of district support personnel, site leadership teams of teachers and administrators, and SummerPrep administrators and teachers. The structure of professional development prior to 2001 did not provide a direct linkage with student achievement. The SIP model was designed to link classroom practices to standards, to identify professional development needs at the site, and monitor changes in classroom practices. All professional development was aligned with SIP.

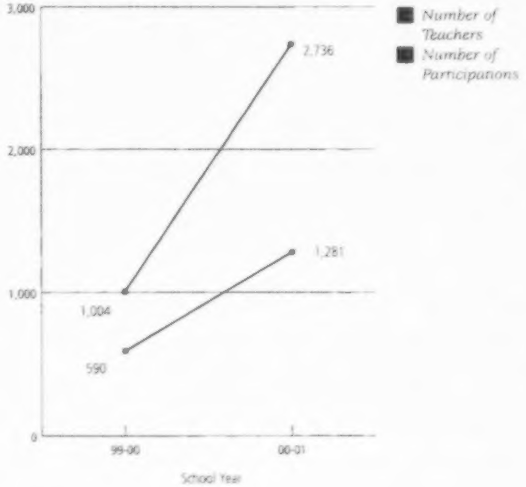
In addition to SIP, CPMSA continued to support and coordinate a range of traditional professional development programs, including summer institutes and workshops. All mathematics and science professional development activities were standards based.

The district suffered a critical shortage of substitute teachers, thus making it difficult to schedule professional development during the school day. To address this issue, the district set aside Wednesdays for SIP and professional development with the Middle School Science Curriculum in Focus Group and the California Professional Development Institutes (CPDIs). The district took additional measures to ensure adequate support for mathematics and science professional development.

According to the 2000-01 Annual Report, the level of participation of teachers in various professional development activities increased from the previous year. As seen in Figure 5.1, the number of teachers who participated in professional development was 1,281 in SY 2000-01 compared to 590 in SY 1999-2000. Many teachers participated in several workshops and institutes. During SY 2000-01, the number of participations in all professional development activities was 2,736 compared to 1,004 in SY 1999-2000.

Figure 5.1

Teacher Participation in Professional Development Activities in SY 1999-2000 and SY 2000-01.



The summer of 2001 was the first time professional development became a requirement for teachers of middle school summer school or SummerPrep and the Rising 9 Summer Bridge program. Summer 2001 was also the first time science was included in the summer school program for grades K-8.

Through CPMSA, OUSD worked with the Lawrence Hall of Science, University of California Berkeley, to have four coaches from the Alliance for Collaborative Change in School Systems (ACCESS) provide in-service training, summer institutes, and in-classroom coaching and support to Algebra teachers in six high schools. Eight middle schools received similar support. ACCESS was a professional development program, established by the Lawrence Hall of Science. It provided coaching, workshops, curriculum development support, and summer institutes for teachers in grades 6-12.

The Governor's Initiative funded higher education institutes in the bay area to conduct California Professional Development Institutes (CPDIs) in mathematics and literacy. They offered 64 hours of professional development during the summer of 2001 and an additional 56 hours of follow-up during SY 2001-02 for participating secondary mathematics teachers.

The district required 15 hours per year of content professional development in mathematics for elementary school teachers, but there were no requirements for science. In SY 2000-01, professional development was built around the new textbooks. In addition, every administrator was required to have 40 hours per year of professional development. According to the Associate Superintendent and Program Director, about 25% of teachers participated in voluntary professional development during 2001-02 and received stipends. Beginning in SY 2002-03, secondary teachers were required to have eight hours of professional development districtwide, plus 18 hours of site-based content professional development.

The majority of elementary teachers were required to participate in an intensive literacy professional development program called Open Court. Every school in the district was required to participate in Open Court for two years. CPMSA worked with the Chabot Space and Science Center and the Lawrence Hall of Science to focus all elementary science professional development on the integration of inquiry science into literacy instruction. Accordingly, CPMSA sponsored a group of 14 elementary teachers who developed integrated science literacy units using FOSS materials and who introduced the units to teachers. The Lawrence Hall of Science conducted the Science Knowledge Inspiring Language Learning (SKILL) program in conjunction with the district to strengthen elementary student literacy skills through hands-on inquiry science.

California Professional Development Institutes (CPDIs)

In one of Governor Gray Davis's education proposals in 2000, a collection of extensive professional development programs was outlined. First implemented in July of 2001, these programs were designed to serve more than 70,000 California teachers who were focused on improving student achievement in core content areas. Included in these programs are opportunities for teachers to:

- Participate in stimulating university-based summer or intercession institutes.
- Engage in a variety of practical year-round activities designed to support their instructional practice.
- Deepen their academic knowledge.
- Refine their classroom teaching strategies.
- Join their school colleagues as members of a high performance team focused on improving student achievement.
- Employ useful common assessment strategies to monitor student progress and inform classroom practice.
- Receive a stipend as compensation for participation.

The University of California and California State University are partners in the coordination of these programs, with the assistance of other independent colleges, universities, and the K-12 community.

Source: http://tepd.ucop.edu/tepd/cpdi/ cpdi_1.html

As a result of the state-wide shortage of teachers, especially in science and mathematics, the district developed a pre-internship and internship program with California State University Hayward for uncertified teachers who held a BA to complete their credentials while teaching in Oakland schools. The New Teacher Support and Development (NTSD) program also provided financial and academic support to teachers on emergency credentials through the Alternative Credential Program and supported new teachers during the critical first three years of teaching to improve retention.

CPMSA worked with the New Teacher Support and Development (NTSD) department, a department of the Division of Teaching and Learning established to recruit and retain qualified teachers. NTSD coordinated all teacher support programs, worked with CPMSA to integrate mathematics and science into NTSD programs, and expanded the SMART Center to house the New Teachers Multi-cultural Resource Center.

CPMSA also worked with Chabot's *Right the First Time* grant to support a teacher-initiated Middle School

Science Curriculum in Focus Group. The group's purpose was to create a set of standards-based lesson units to support the large number of new teachers and to provide a common reference point for the study of student work through SIP.

Training of the first secondary mathematics and science teacher leaders began in the spring of 2000, through the district's partnership with the Chabot Space and Science Center. Beginning in SY 2002-03, teacher leaders (also known as instructional facilitators) were assigned to 30 out of 60 elementary schools to provide teachers with professional development and coaching. Teacher leaders were given release time (about two hours per week) and either volunteered or were recommended by school principals.

In addition to instructional facilitators, Teachers on Special Assignment (TSA) were hired to address K-12 district curricular and professional development needs. TSAs were regular teachers who were taken out of the classroom for a specific period of time to support instruction through a variety of projects. They provided coaching and professional development. They also collaborated with groups of teachers to develop the curriculum and prepare curricular guides. In 2000, the district had five mathematics and three science TSAs. In 2001, TSA positions were eliminated to address the teacher shortage and place more qualified teachers back in the classrooms. TSAs were replaced with instructional facilitators in SY 2001-02. About half of the 50 instructional facilitators were assigned to the Open Court literacy program.

The district recruited teachers to apply for National Board Certification. By the beginning of SY 2001-02, the district had eight National Board Certified teachers, four of whom were middle school mathematics and science teachers. Furthermore, the district gave teachers with proven track records a greater role in curriculum development and professional development.

POLICY SUPPORT FOR HIGH QUALITY TEACHING AND LEARNING

An important aspect of educational reform was the adoption of district policies that had an impact on the quality of mathematics and science. Policies were enacted that supported the goals outlined in the superintendent's Recovery Plan and the CPMSA strategic plan. The following policies were adopted by the Board in 2001:

- **Graduation Requirements.** Beginning with the Class of 2004 three years of mathematics (including Algebra and Geometry) and three years of science (including Physical Science and Biology), as well as completing 230 credits with a minimum of 2.0 grade point average were required for graduation. The district also adopted the University of California's A-G entrance requirements.
- ***Algebra for All.*** The district adopted the *Algebra for All* policy in 1998, requiring all students to take Algebra by the 9th grade, with the goal of having all students in Algebra in the 8th grade by 2004.
- **Promotion and Retention.** Policies to end social promotion were enacted in 2001 to establish standards-based criteria for student promotion based on minimum achievement as reported through standardized testing, course grades, and other indicators of achievement.
- **Small Autonomous Schools.** With a grant from the Gates Foundation, BayCES(Coalition for Equitable Schools) partnered with the district to implement the Small Learning Community/Small Autonomous Schools policy for entering 9th graders, beginning in September 2001.
- **AP Courses.** All high schools were required to offer a minimum of AP Calculus courses, as well as all core courses that meet the University of California's A-G requirements.
- **Multiple Assessments.** The district began implementing the policy requiring multiple assessments in all core content areas, starting with reading, writing, and mathematics in 2000-01.
- **Elimination of Tracking.** The Board policy eliminating tracking had been in place for several years. According to one of the members, the Board continued to work diligently on implementing this policy.

Other major policy changes advanced by the Board included eliminating multi-track education, approving the autonomous schools policy, and promoting more site-based management. The Board also stressed the need for qualified teachers in mathematics and science. They advanced a 26% pay raise over the teachers' three-year contract and the teacher support system.

CONVERGENCE OF EDUCATIONAL RESOURCES

Beginning in 2000, all resources were focused on improving achievement for all students and closing the gap between White and underrepresented minority students. Consistent with the district's policy, all funds, including the CPMSA grant, were directed to support the goals and objectives outlined in Superintendent Chaconas' Recovery Plan. Proposals for new grants were not approved unless they directly supported district reforms. The district established the Grants Office to ensure that grant applications were in alignment with district goals and priorities, as well as to monitor existing grants and provide access to data and funding opportunity notification. One of the projects supported by CPMSA was the creation of a Grants Office database and web site in 2001, which enabled service providers to update their information on-line.

Much of the support for professional development and student support came from grants obtained by third party organizations including WestEd; Chabot Space and Science Center; Lawrence Hall of Science; Physics Teachers Resources and Assessment (PTRA), an American Association of Physics Teachers program funded through NSF and housed at the Lawrence Berkeley Laboratory; and Project SOAR (Seizing Opportunities for Achievement and Retention), a six-week academic summer program that builds the writing, verbal, mathematics, social and study skills that are necessary for students to succeed in college.

A major CPMSA effort grew out of the Implementation Evaluation of CPMSA (1997-2000), which indicated that inadequate facilities were a major barrier to teaching hands-on science and providing the required laboratory experiences to all high school students. In the spring of 2001, CPMSA staff conducted an on-site audit of every secondary classroom used for science instruction and surveyed secondary science department heads. The resulting report, *Survey of Secondary Science Laboratory Facilities*, affirmed the absence of science facilities in middle schools and the need for significant repair of high school laboratory facilities. This report provided input into planning for the bond issue, Measure B, which was approved in November 2001. Work with Risk Management and Facilities began shortly after to eliminate the most common facility problems.

One of the most significant efforts supported by CPMSA was the renovation of two buildings at the old Chabot Science Center to create the Science and Mathematics Activities and Resources for Teachers or SMART Center. This resource center refurbished and distributed FOSS kits, and provided limited coaching in the use of the kits and other inquiry-based science materials. The Center used one time state science materials funds and some CPMSA funds to acquire additional FOSS kits. By the fall of 2001, it was able to distribute two kits each year to every K-6 grade teacher. One of the OUSD partners, the Lawrence Berkeley Laboratory, offered a van for the distribution of the kits. In addition to science materials, the SMART Center began circulating mathematics resources for the first time.

PARTNERSHIPS

Broad-based support for the OUSD schools and CPMSA came from higher education institutions, community-based organizations, and other educational and scientific agencies. While Oakland enjoyed a large community of mathematics and science resource agencies, the challenge was building strong collaborations that were focused on the identified needs of Oakland students and their families, and providing resources appropriate for Oakland's diverse student population. Beginning in 2000-01, the focus was to strengthen the relationships with key partners who had the capacity to support reform in a large district. These partners included Education Trust, UC Berkeley, CSU Hayward, Mills College, Lawrence Hall of Science, Chabot Space and Science Center, Lawrence Berkeley National Laboratory, and Bay Area Consortium for Effective Schools (BayCES). BayCES was also the major partner for the Small Schools initiative and the fiscal agent for the Gates Foundation award.

CPMSA staff met with the Consortium of After-School Service Providers and the Professional Development Consortium to outline district strategies to attain the goal of high achievement for all students. Each consortium was broad-based and represented both educational institutions and community based service agencies. In addition, the district worked closely with the higher education institutes and the County Office of Education involved in the Governor's Initiative to align the major professional development initiatives with the goals of the district.

LEADERSHIP

Superintendent Chaconas was at the forefront of the district's reform effort and was very visible in the greater Oakland community as an advocate for systemic reform and achievement for all students. Several teachers and administrators applauded his efforts and affirmed the critical role he played in outlining and implementing his Recovery Plan and emphasizing the goal of high achievement for all students through improved teaching and learning.

With the new district leadership, there was an increase in financial support for the entire reform effort as well as for mathematics and science. The increased support was evidenced in a new partnership with the Lawrence Berkeley National Laboratories, as well as with existing partners such as the Middle School Science Curriculum in Focus group project with the Chabot Space and Science Center. In addition to Chabot, the Lawrence Hall of Science, UC Berkeley, and Alameda County Office of Education worked with the district for the first time in 2001. They planned and implemented the Governor's Initiative CPDIs in mathematics and literacy, which provided professional development during the summer and the following academic year.

STUDENT ACHIEVEMENT

Consistent with the Superintendent's Recovery Plan, CPMSA outlined a strategic plan for 2000-01, and a similar plan for 2001-02. Student achievement goals for the CPMSA grant were based on the proposal to NSF from OUSD, which outlined several mathematics and science achievement goals. The following is a list of the measurable goals that are presented in this section:

GOAL 1. Double the number of minority students who enroll in Algebra in grade 9 by Year 5.

GOAL 3. Increase by 10% the number of students who take the SAT; improve mathematics scores by 10%.

GOAL 4. Increase average performance on the new standardized tests by 5 percentile points.

GOAL 5. Increase participation of minority students in AP mathematics and science classes by 100%.

Goal 2 – double the number of minority students who successfully complete the college preparatory A-F course sequence and are prepared to enter college by Year 5 – was unable to be measured.

In addition to the listed goals, a number of other mathematics and science achievement data are also presented as indicators of student progress.

URM enrollment in Algebra I in 9th grade

GOAL 1: Double the number of minority students who enroll in Algebra in grade 9 by Year 5.

The percentage of the total 9th grade underrepresented minority (URM) student population enrolling in Algebra I increased 42 percentage points (pp) over five years, rising from 29% of the total 9th grade URM population in 1996-97 (782 students to 71% (2,369 students) in 2000-01, the fourth year of the CPMSA project. The 5th year goal of doubling the number of URM 9th graders enrolling in Algebra I was exceeded by year 3 of the project. The number of all 9th graders enrolling in Algebra I also increased, from 1,156 to 2,927.

The percentage of 9th grade URM students that have completed Algebra I has also increased, rising from 17% (450) in SY 1996-97 to 21% (716) in 2000-01. Similarly, the completion percentage for all 9th grade students rose from 20% to 22% over the same time span.

Figure 5.2 illustrates the enrollment and completion trends for URM and all students in Algebra I in 9th grade between SY 1996-97 and SY 2000-01.

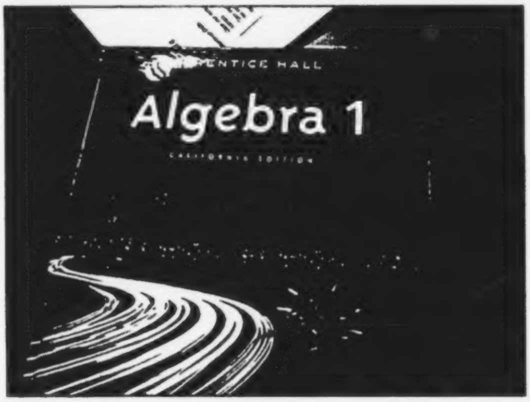
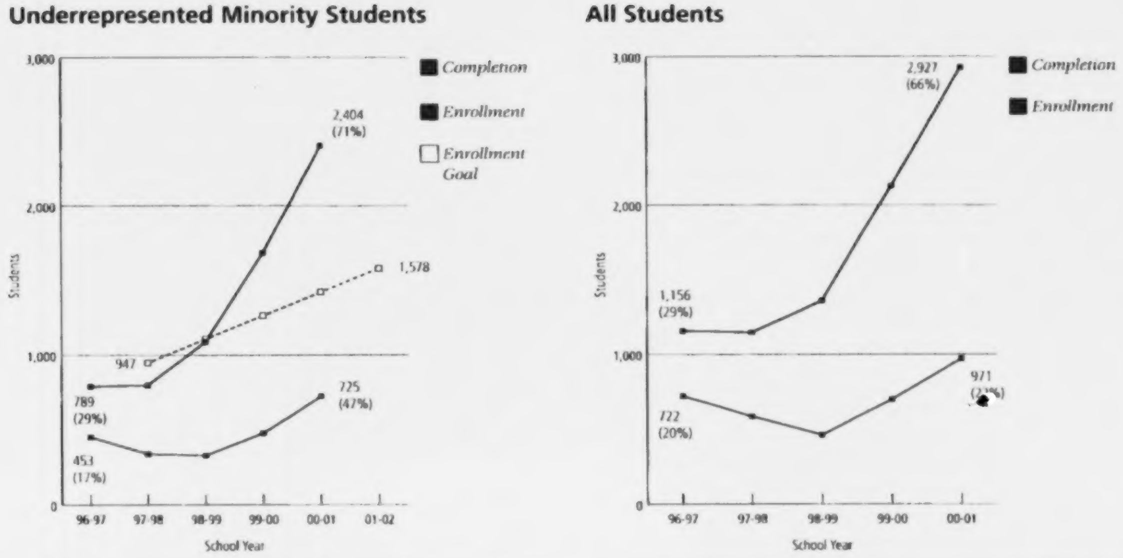


Figure 5.2

Algebra I in 9th Grade[*2]



Underrepresented Minority Students

All Students

SY	96-97	97-98	98-99	99-00	00-01	01-02
G9 URM Population	2,710	2,861	2,959	3,044	3,389	•
URM Enrollment	789	798	1,087	1,683	2,404	•
URM Completion	453	340	330	479	725	•
URM % Enrollment[*1]	29%	28%	37%	55%	71%	•
URM % Completion[*1]	17%	12%	11%	16%	21%	•
Enrollment Goal		947	1,105	1,262	1,420	1,578
Goal %		33%	37%	41%	42%	•

[*1] % of total G9 URM population

(•) Case story only includes data up to CPMSA Year 4

SY	96-97	97-98	98-99	99-00	00-01
G9 Population	3,647	3,873	3,969	4,063	4,435
Enrollment	1,156	1,146	1,358	2,130	2,927
Completion	722	586	463	700	971
% Enrollment[*1]	32%	30%	34%	52%	66%
% Completion[*1]	20%	15%	12%	17%	22%

[*1] % of total G9 population

SAT

GOAL 3: Increase by 10% the number of students who take the SAT; improve scores by 10%.

The number of students who took the Scholastic Achievement Test (SAT) was stable during the first four years of the CPMSA grant period, rising slightly from 971 to 978 test-takers over five years. There was a slight decrease in the mathematics mean score for all students, from 445 in SY 1996-97 to 439 in SY 2001-02. This goal is not on track to be achieved by year 5 of the CPMSA project.

Figure 5.3 shows the number of students who took the SAT between SY 1996-97 and 2001-02 and the mean scores for the mathematics portion.

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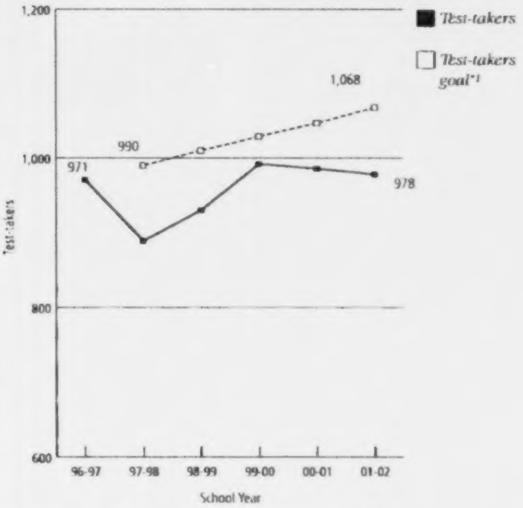
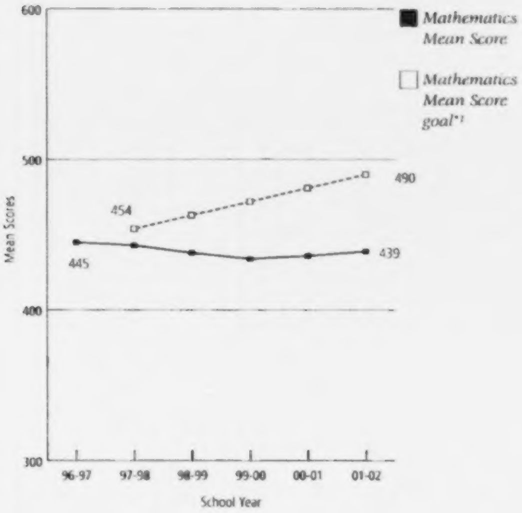
Figure 5.3

SAT Test-takers and Mathematics Mean Scores

SAT Test-takers



SAT Mathematics Mean Scores



SY	96-97	97-98	98-99	99-00	00-01	01-02
Test-takers	971	889	930	992	986	978
Math Mean Score	445	443	438	434	436	439
Test-takers goal*1		990	1,010	1,029	1,047	1,068
Math Mean Score Goal		454	463	472	481	490

*1 Annual goals based on a linear increase

SAT-9 Achievement Test

GOAL 4: Increase average performance on the new standardized tests by 5 percentile points.

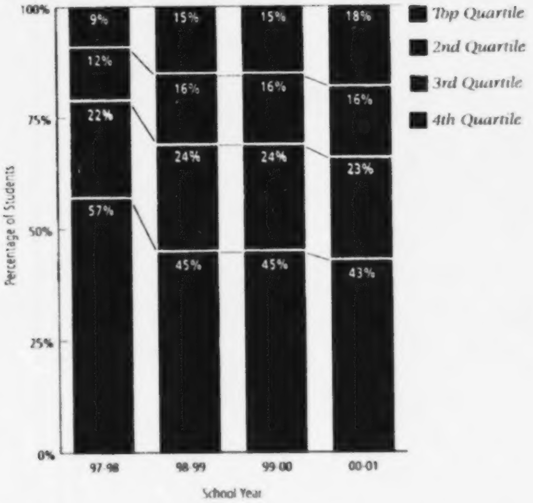
Before CPMSA implementation began in 1998, the OUSD administered the Terra Nova achievement test. In 1998, the district administered both the Terra Nova and the SAT-9 tests, but in 1999 and 2000, only the SAT-9 test was administered, thus the "new" standardized test refers to SAT-9.

State Assessment Test (SAT-9) data were available for grades 4, 8, and 10 in mathematics and for grade 10 in science. SAT-9 results in mathematics revealed an increase in the percentage of students passing in grade 4 (from 21% of students passing in 1997-98 to 34% passing in 2000-01), and a slight increase in grade 8 (27% to 28%) during the same time period. Passing rates also increased slightly in grade 10 (29% to 30%). Tenth grade SAT-9 results in science revealed a slight increase in the percentage of students passing, from 27% of students passing in SY 1997-98 to 28% in SY 2000-01.

Figure 5.4 shows SAT-9 results in mathematics and science between SY 1997-98 and SY 2000-01.

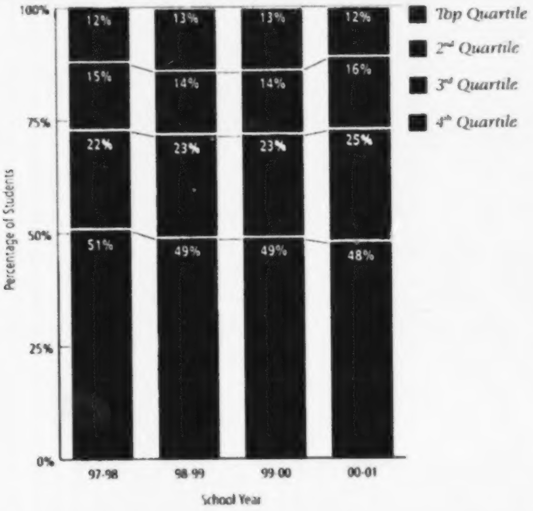
Figure 5.4

Grade 4 - Mathematics



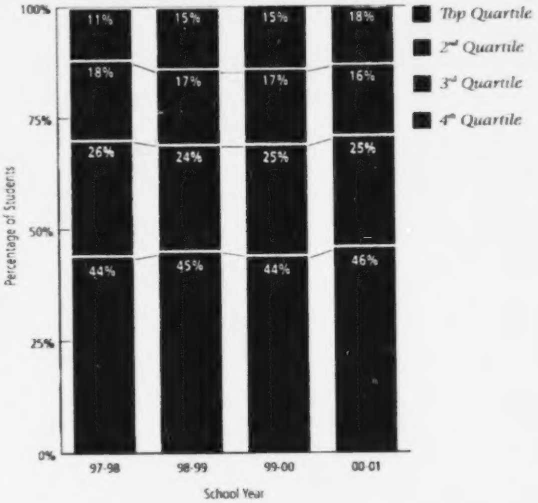
SY	97-98	98-99	99-00	00-01
Top Quartile	9%	15%	15%	18%
2nd Quartile	12%	16%	16%	16%
3rd Quartile	22%	24%	24%	23%
4th Quartile	57%	45%	45%	43%
Total Number of Students	4,239	3,665	3,640	4,242

Grade 8 - Mathematics



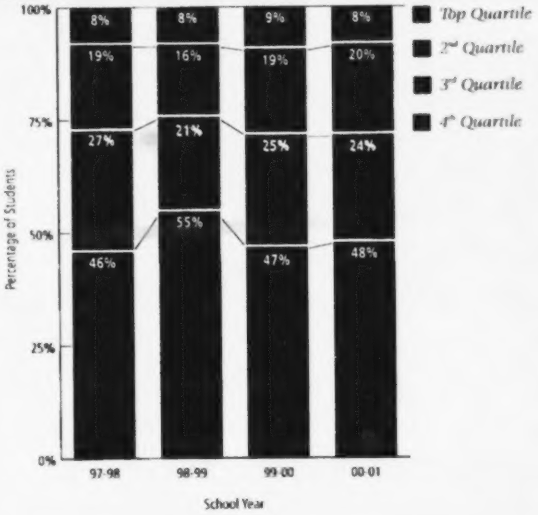
SY	97-98	98-99	99-00	00-01
Top Quartile	12%	13%	13%	12%
2nd Quartile	15%	14%	14%	16%
3rd Quartile	22%	23%	23%	25%
4th Quartile	51%	49%	49%	48%
Total Number of Students	2,928	2,842	2,778	3,135

Grade 10 – Mathematics



SY	97-98	98-99	99-00	00-01
Top Quartile	11%	13%	14%	14%
2nd Quartile	18%	17%	17%	16%
3rd Quartile	26%	24%	25%	25%
4th Quartile	44%	45%	44%	46%
Total Number of Students	2,032	2,029	1,972	2,008

Grade 10 – Science



SY	97-98	98-99	99-00	00-01
Top Quartile	8%	8%	9%	8%
2nd Quartile	19%	16%	19%	20%
3rd Quartile	27%	21%	25%	24%
4th Quartile	46%	55%	47%	48%
Total Number of Students	1,946	2,164	1,902	1,841

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Underrepresented Minority Student Participation in AP Mathematics and Science

GOAL 5: Increase participation of minority students in AP mathematics and science classess by 100%

Data for this goal is unavailable, however, the number of AP mathematics and science tests taken is another indicator of achievement in this area. Over the five years of the CPMSA grant, the number of AP mathematics tests taken by URM students remained steady, rising from 12 to 13 over the period, with a peak of 23 in SY 1999-00. During that same time period, the number of AP mathematics tests taken by all OUSD students increased steadily from 102 in SY 1997-98 to 166 in 2001-02.

The number of AP science tests taken by URM students from SY 1997-98 to 2000-01 rose from 6 to 26, with a peak of 41 in SY 1999-00. All AP science tests taken during that time rose sharply from 21 in SY 1997-98 to 194 in SY 2000-01, before decreasing to 147 by year five of the grant period.

Figure 5.5 illustrates the number of AP tests taken in mathematics and science by URM and total students between SY 1997-98 and SY 2001-02.

During the CPMSA grant period, URM achievement in AP mathematics and science remained steady. The number of URM students scoring 3 or above on the AP mathematics test remained between 2 and 5 from SY 1997-98 to 2001-02. Similarly, these figures for the AP science test stayed between 0 and 3 in those years.

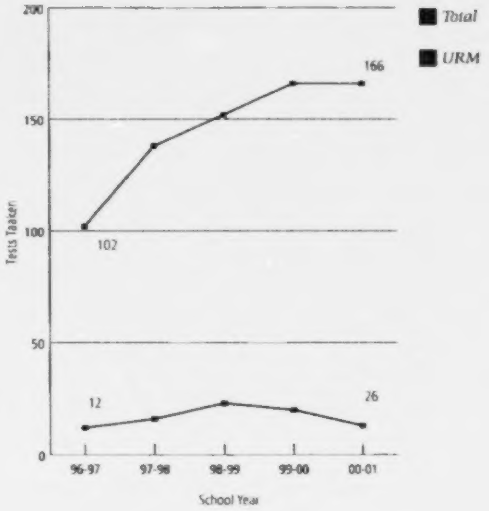
Comparatively, the total number of students scoring 3 or above on the AP mathematics test rose from 49 in SY 1997-98 to 64 in 2001-02, while in science those numbers grew from 1 in SY 1997-98 to 29 in 2001-02.

Figure 5.6 shows the number of URM and total students scoring 3 or above on the AP mathematics and science tests between SY 1997-98 and SY 2001-02.

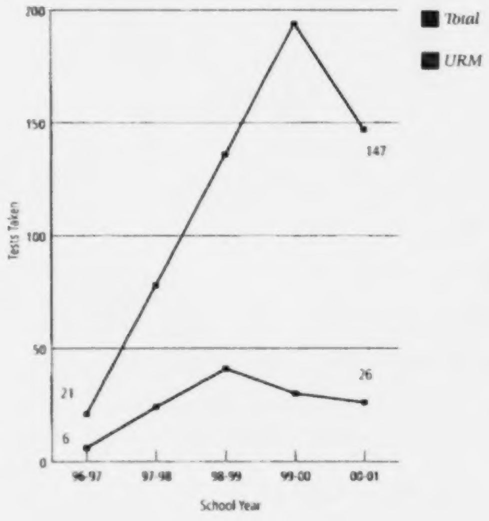
Figure 5.5

AP Tests Taken

Mathematics



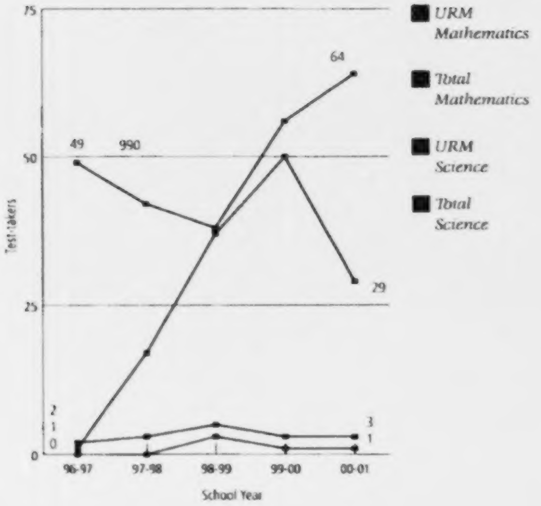
Science



SY	97-98	98-99	99-00	00-01	01-02
URM Mathematics	12	16	23	20	13
Total Mathematics	102	138	152	166	166
URM Science	6	24	41	30	26
Total Science	21	78	136	194	147

Figure 5.6

AP Mathematics and Science – Scoring 3 or Above



SY	96-97	97-98	98-99	99-00	00-01
URM Mathematics	2	3	5	3	3
Total Mathematics	49	42	38	56	64
URM Science	0	0	3	1	1
Total Science	1	17	37	50	29

Other indicators of student achievement

In addition to the goals outlined in the OUSD CPMSA project, other data are available to assess student mathematics and science achievement.

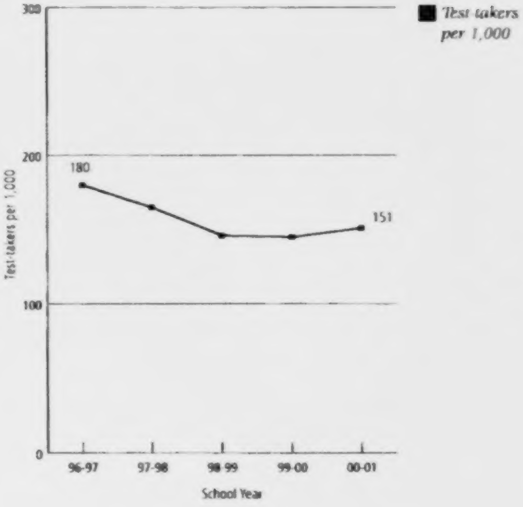
American College Test (ACT)

The number of students taking college entrance exams is an indicator of their intention to pursue post secondary education. As shown in figure 5.7 the number of ACT test takers fell from 353 in SY 1996-97 to 239 in 2001-02, also measured by the number of test takers per 1,000 students: from 180 in the baseline year to 151 in year 4 (12th grade student population data are unavailable for year 5).

ACT composite scores for OUSD remained steady in both mathematics (19.8 to 19.6) and science (17.7 to 17.6) over the 5 years of the CPMSA grant period.

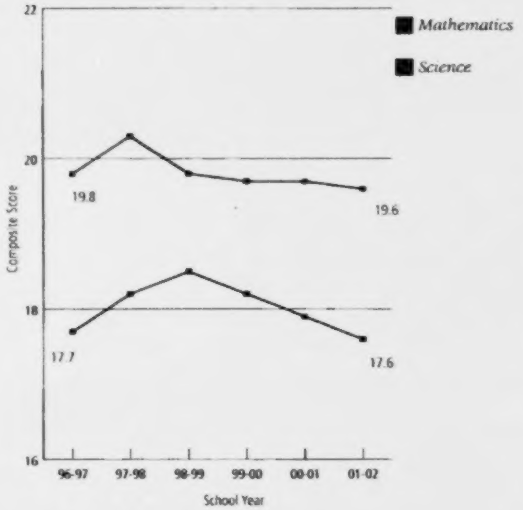
Figure 5.7

ACT Test-takers per 1,000 Students



SY	96-97	97-98	98-99	99-00	00-01	01-02
Total G12 Population	1,956	1,883	1,962	1,983	1,984	n.a.
Test-takers	353	310	286	288	299	239
Test-takers per 1,000	180	165	146	145	151	n.a.

ACT Composite Scores



SY	96-97	97-98	98-99	99-00	00-01	01-02
Math. Comp. Score	19.8	20.3	19.8	19.7	19.7	19.6
Science Comp. Score	17.7	18.2	18.5	18.2	17.9	17.6

Enrollment and Successful Completion of Mathematics Gate-Keeping Courses in Grades 9-12

Algebra II enrollment and completion declined throughout the first four years of the CPMSA project period; enrollment from 1,161 to 821 and completion from 734 to 509 between the baseline year of 1996-97 to SY 2000-01.

After minor decreases in the first two years of the CPMSA grant period, Geometry enrollment increased to 2,736 students in SY 2000-01. The 2000-01 enrollment total is an increase of 680 students from the baseline year figure of 2,056. Despite the increase in Geometry enrollment, completion dropped from 1,302 in SY 1996-97 to 1,264 in 2000-01.

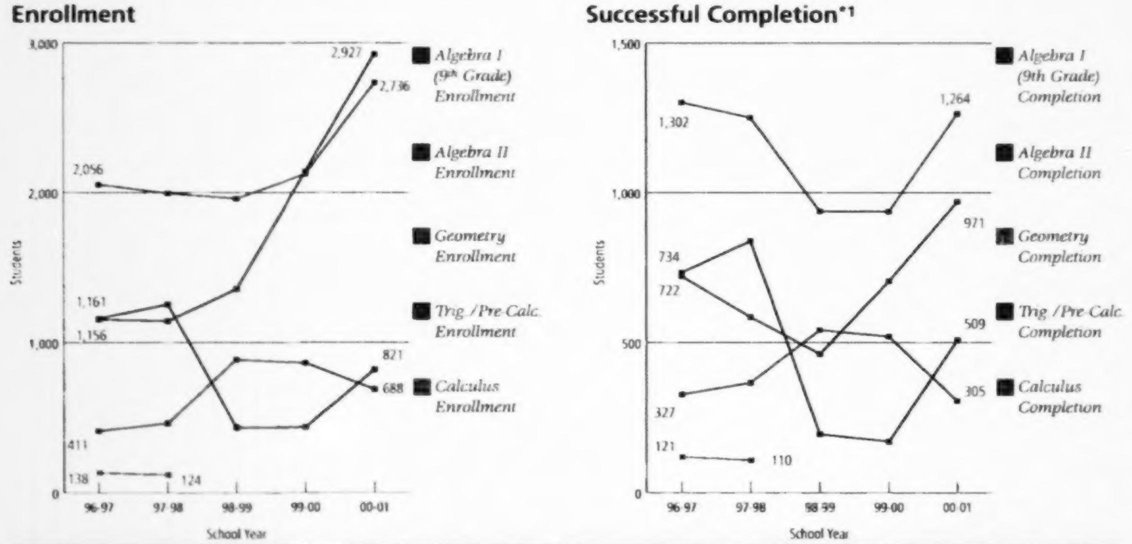
Enrollment in Trigonometry/Pre-Calculus had more than doubled by the second year of the grant period (411 to 886 students) before decreasing to 688 students in SY 2000-01. Completion figures followed a similar trend as Geometry, falling from 327 in SY 1996-97 to 305 in 2000-01, with a peak of 542 in 1998-99.

Calculus enrollment and completion is not available after SY 1997-98.

The percentage of grade 9-12 students who successfully completed a mathematics gate-keeping course (including Algebra I) remained steady at 21% in SY 1996-97 and 2000-01. The percentage had dropped to 16% in 1998-99 before increases in both SYs 1999-00 and 2000-01.

Figure 5.8 illustrates enrollment and completion figures for mathematics gate-keeping courses between SY 1996-97 and SY 2000-01.

Figure 5.8
Mathematics Gate-Keeping Courses



Enrollment

Successful Completion[1]

		96-97	97-98	98-99	99-00	00-01
G9-12 Population		11,538	11,346	11,878	11,634	12,320
Algebra I (9th Grade)	Enrollment	1,156	1,146	1,359	2,142	2,927
	Completion	722	586	463	706	971
Algebra II	Enrollment	1,161	1,256	435	437	821
	Completion	734	839	195	171	509
Geometry	Enrollment	2,056	1,997	1,963	2,126	2,736
	Completion	1,302	1,251	939	938	1,264
Trigonometry/ Pre-Calculus	Enrollment	411	462	886	863	688
	Completion	327	366	542	520	305
Calculus	Enrollment	138	124	.	.	.
	Completion	121	110	.	.	.
TOTAL	Completion	2,472	2,313	1,944	2,164	2,540
	% Completion[2]	21%	20%	16%	19%	21%

[1] Successful Completion defined as a grade of "C" or better

[2] Completion of total G9-12 population

Enrollment and Successful Completion of Science Gate-Keeping Courses in Grades 9-12

Physics enrollment in grades 9-12 increased between SY 1996-97 to 2000-01 from 281 to 285 students. The number of students successfully completing Physics in that same time period decreased, from 250 in SY 1996-97 to 237 in 2000-01.

Grade 9-12 enrollment in Biology increased by almost 300 students from SY 1996-97 to SY 2000-01 (2,438 to 2,702 students). However, the number of students who successfully completed Biology dropped, falling from 1,357 to 1,150 during that time.

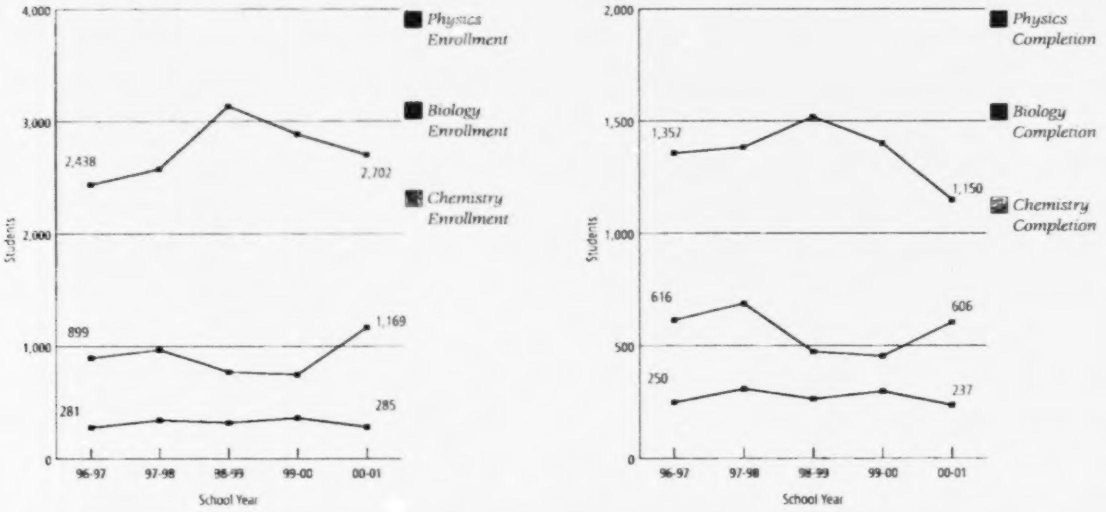
Chemistry enrollment in grades 9-12 experienced an increase from 899 students in SY 1996-97 to 1,169 in SY 2000-01. The completion figures fell from 616 to 606 during that period.

The percentage of students who successfully completed a science gate-keeping course fell from 19% in SY 1996-97 to 16% in 2000-01. The percentage had increased to 21% in 1997-98 before decreasing for three consecutive school years.

Figure 5.9 shows enrollment and completion figures for science gate-keeping courses between SY 1996-97 and SY 2000-01.

Figure 5.9

Science Gate-Keeping Courses



Enrollment

Successful Completion*1

	SY	96-97	97-98	98-99	99-00	00-01
G9-12 Population		11,538	11,346	11,878	11,634	12,320
Physics	Enrollment	281	345	323	364	285
	Completion	250	310	265	299	237
Biology	Enrollment	2,438	2,576	3,134	2,887	2,702
	Completion	1,357	1,384	1,519	1,401	1,150
Chemistry	Enrollment	899	972	775	751	1,169
	Completion	616	690	476	456	606
TOTAL	Completion	2,223	2,384	2,260	2,156	1,993
	% Completion*2	19%	21%	19%	19%	16%

*1 Successful Completion defined as a grade of "C" or better

*2 Completion of total G9-12 population

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CONCLUSION

The CPMSA project in the Oakland Unified School District (OUSD) made several significant steps toward bettering the mathematics and science achievement of its students while still leaving room for improvement in other areas. Reform areas included professional development, partnerships, curriculum, instruction and assessment.

One of the most significant changes in OUSD was brought about by the CPMSA Strategic Plan. As cited by Assistant Superintendent Louise Waters, in the spring of 2000 over 700 of OUSD teachers were working with emergency credentials, which indicated unacceptable teaching backgrounds. To combat this issue, OUSD established partnerships with higher education institutions to provide professional development and by September of 2002 the number of teachers with emergency credentials was reduced from over 700 to 29.

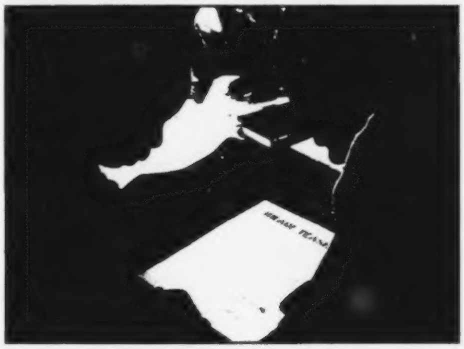
The aforementioned Strategic Plan impacted other areas of professional development as well. During SY 1999-00 590 teachers participated in 1,004 professional development activities. The following year, SY 2000-01, 1,281 OUSD teachers participated in professional development activities, an increase of 691 teachers. The increase in the activities was even more dramatic, increasing by 1,732 from 1,004 activities to 2,736. In one year not only was there more than a 100% increase in the number of teachers participating in professional development, but many teachers participated in several workshops and institutes during the course of the year.

Many partnerships were formed between OUSD and neighboring organizations. They worked with institutions of higher education such as UC Berkeley and Mills College, bodies of learning such as Lawrence Hall of Science and the Chabot Space and Science Centers, as well as many others. Numerous partners combined to form broader based Consortiums that met with CPMSA staff. Out of these partnerships sprang district strategies to better attain the goals of high achievement for all students.

The first goal submitted by OUSD to the National Science Foundation, "Double the number of minority students who enroll in Algebra in grade 9 by Year 5," was extraordinarily successful. At the program's inception in SY 1996-97, 789 minority students were enrolled in Algebra I in the 9th grade. By SY 2000-01, 2,404 students were enrolled in Algebra I in the 9th grade, an increase of 1,615 students. The original goal set for SY 2000-01 in OUSD's proposal was 1,420 students, a number exceeded by nearly 1,000 students.

Despite this progress, the Oakland Unified School District recognizes there is still much room for improvement. The number of students taking the SAT increased slightly but fell below the goal of a 10% increase. The 4th grade assessment test data exceeded the goal of a 5% increase, but grades 8 and 10 each only increased by 1%.

Several goals were met or exceeded during the CPMSA program in the Oakland United School District, while others showed signs of slight improvement. The areas of professional development and gate-keeping enrollment, in particular, displayed significant improvement. Despite this success, OUSD is working to ensure that these are a harbinger of larger changes to come that will continue to improve student achievement in standards-based mathematics and science curricula.



Section VI

PROJECT TEAMS: TEACHING EASY ACCESS TO MATHEMATICS AND SCIENCE – MONTGOMERY PUBLIC SCHOOLS CPMSA

TEACHING EASY ACCESS to Mathematics and Science (TEAMS) links a largely urban school system to broad-based partnerships of higher education, business, industry, and community organizations to boost achievement in college preparatory science and mathematics. TEAMS is a collaborative venture of the Montgomery Public Schools (MPS) with Alabama State University, the University of Alabama in Birmingham, Auburn University, BellSouth, TCI Cable Television, and the Montgomery YMCA. Project TEAMS addresses the system-wide commitment to raising student expectations, improving teacher performance, and providing support for all students to succeed.

Project TEAMS began in 1998 when the MPS sought funding from the National Science Foundation (NSF) through the Comprehensive Partnership for Mathematics and Science Achievement (CPMSA). The District received $3.4 million in funding for five years (1998-2002), with the Office of Educational Improvement, recently renamed the Department of Curriculum and Instruction, bearing the responsibility for project oversight. The CPMSA leadership team included Dr. Clinton Carter as the Principal Investigator, Dr. Robert Dewberry as the Co-Principal Investigator, and Ms. Tina Bowlin as the Project Director.

In SY 1998-99, Project TEAMS began a system-wide initiative with a specific focus on improving student achievement through enhanced instruction and student support. It provided the avenue for district-wide profes-

Montgomery Public Schools Facts In Brief (SY 2000-01)

Students[*1] Total: 32,642
CPMSA Students: 28,423
African American: 76%
White: 22%
Other: 2%

Male: 52%
Female: 48%

Students Enrolled in:
Elementary Schools: 52%
Middle Schools: 24%
High Schools: 24%
Ungraded: 0%

Schools Total: 58[*2]
Elementary Schools: 37
Middle Schools: 12
High Schools: 9

Mathematics & Science Teachers Total: 1,181
Elementary School Teachers: 876
Middle School Teachers: 160
High School Teachers: 154

Selected Key Indicators (District Average)
Free/Reduced Lunch: 64.0%
Limited English Proficiency: 0.1%
Special Education: 12.4%
Daily Average Attendance: 94.0%
Drop-out Rate: 1.4%
Per Pupil Spending: $5,398
Average Class Size: 25
Number of Students per Computer: 6
Classrooms with Internet Access: 100%

[*1] Sources: CDE 2001, TISC-2002

[*2] 44 schools participated in Project TEAMS

sional development and on-site teacher support resulting in improved mathematics and science instruction for all students. It also provided effective student support programs. By the end of SY 2000-01, which was the third year of CPMSA implementation, there was slow but steady improvement in student performance and closing of the achievement gap. Enrollment and successful completion in gate-keeping and upper-level mathematics and science courses increased for all students; and standardized test results, including the Stanford Achievement Test (SAT-9), showed steady improvement by underrepresented minority students in mathematics and science, resulting in a gradual narrowing of the gap between minority and non-minority academic achievement.

This case story is based on reports from frontline administrators and teachers that were recounted to the study team during a site visit in October 2002. Other source information came from annual reports prepared for NSF by school district officials, the Montgomery Public Schools Strategic Plan, the original proposal submitted to NSF, and Tabulated Indicators for Systemic Change (TISC-2001), collected and compiled by Systemic Research, Inc.

A Profile of Montgomery, Alabama

Montgomery, the second largest city in Alabama (population 201,568), is the state capital and is located in the center of the state. It is ranked as one of America's most historically significant cities, being the birthplace of the civil war and the civil rights movement. In 1965, Dr. Martin Luther King, Jr., finished his march from Selma to Montgomery on the state capital steps.

WATERS
STREAM

The city is also a regional trade and transportation hub, home of a major United States Air Force Base, and the site of the Alabama TechnaCenter, a research park developed around software engineering. The development of the Riverfront and downtown area began in 2001 as a road map to business success.

Montgomery has three public universities, five private colleges, and two public technical trade schools. Knowing that 75% of school-age children attend Montgomery Public Schools, the K-12 school system is committed to ensuring high quality education for all students.

Montgomery, AL

Sources: http://www.ci.montgomery.al.us and
http://www.montgomerychamber.com

Montgomery Public Schools District Demographics

During the first year (SY 1998-99), Project TEAMS focused on Carver High School and its nine feeder schools. All non-magnet and alternative schools were included in the following years. By SY 2000-01, project TEAMS included 28,423 students in 44 schools. The district-wide ethnic distribution was 76% African American, 22% White, and 2% other. Sixty-four percent of Montgomery schools were designated as Title I schools, indicating a large number of students on free or reduced lunch.

PROJECT TEAMS GOALS AND OBJECTIVES

The overarching goal of Project TEAMS was to offer all students enhanced opportunities to benefit from effective instruction in mathematics and science, which would prepare them to pursue programs in science, engineering and mathematics (SEM). According to MPS's original proposal to NSF, Project TEAMS set the following goals:

1. Double the number of students enrolling in, and successfully completing, advanced mathematics and science courses
2. Double the enrollment of underrepresented minority students in advanced mathematics and science courses
3. Double the number of graduates who successfully complete Physical Science by the end of the 9th grade
4. Improve teacher performance through enhanced professional development programs
5. Increase parental involvement by 25% through improved access to schools and faculty
6. Increase community involvement by 25% through linkages between schools and businesses and other community organizations
7. Raise student performance in mathematics and science achievement to national and state levels as measured by the Stanford Achievement Test series
8. Revise the mathematics curriculum to meet local, state, and National Council of Teachers of

Mathematics Standards

9. Revise the science curriculum to meet local, state, and National Science Education Standards

Prior to the implementation of Project TEAMS in SY 1998-99, MPS student enrollment in gate-keeping and advanced mathematics and science courses was low (10% in mathematics and 14% in science). According to the District's original proposal to NSF, this was due in great measure to inadequate instruction, such as using methods inappropriate for various learning styles, deficiency of instructional materials, and lack of guidance. Other problems facing MPS were inadequate parental involvement, insufficient school facilities, and inadequate local school funding.

Project TEAMS developed the following seven objectives to restructure and enrich the learning environment of MPS:

1. Deliver a comprehensive, standards-based curriculum to enhance student achievement
2. Strengthen staff capacity to deliver quality instruction through an intensive staff development program
3. Develop academic counseling strategies that successfully transfer students from K-12 science and mathematics education to undergraduate programs in science, mathematics, engineering and technology (SMET)
4. Elevate parental expectations and participation in student educational experiences
5. Mobilize community resources and forge collaborative partnerships that stimulate student interest by demonstrating real-world relevance
6. Demonstrate student achievement through a multi-faceted approach to assessment
7. Develop, expand, or revise policies that provide administrative support for the improvement of science, mathematics, and technology instruction at all levels

MPS staff used various strategies to reach their goals. They increased student interest in science and mathematics through demonstrating real-world application and providing student support. They formed partnerships with higher education institutes, local businesses, and community organizations. Teachers and staff participated in intensive professional development, focusing on effective teaching methods. Parents were offered the assistance needed to enable them to become more involved in their children's education. All strategies were designed to increase student achievement and equitable education for all Montgomery students.

ENACTING STANDARDS-BASED CURRICULUM, INSTRUCTION, AND ASSESSMENT

The implementation of a new curriculum framework had begun in the 1996-97 school year. According to the 2000-01 CPMSA Annual Report, the project was the impetus for revising the school system's science and mathematics curriculum frameworks during the summer of 2000. The revised curricular frameworks were aligned with content standards, performance-based indicators, and standardized test objectives. In addition, science and mathematics curricula were aligned with national and state standards. The mathematics curriculum followed the National Council of Teachers of Mathematics (NCTM) standards, while the science curriculum followed the National Standards for Science based on the Mid-continental Education Laboratory adaptation of the National Science Teacher Association Standards (NSTAS).

MPS also established minimal criteria or standards for each K-12 course, which must be passed by at least a 64% score for students to move from one grade level, or one course, to another. All teachers received training in standards-based instruction and evaluation, as a part of their overall professional development. Furthermore, principals were instructed to request daily lesson plans from their teachers. The lesson plans were correlated with the Alabama Course of Study standards, the standardized test (Stanford Achievement Test) objectives, and the Alabama High School Graduation Exam (AHSGE) standards, when applicable.

The CPMSA initiative also allowed MPS to eliminate "watered-down" courses. Algebra I replaced Algebra I A and B and Algebra II/Trigonometry replaced Algebra II. Consumer Mathematics was eliminated and Statistics was added. Students were also able to take Advanced Placement (AP) Calculus via the Distance Learning Laboratory. Ninth grade Integrated Science was eliminated and replaced with Physical Science. Algebra II/Trigonometry became a prerequisite for Physics. Two CPMSA schools added additional AP courses to their offerings during SY 2000-01. While there were established criteria/prerequisites to enroll students in upper-level mathematics and science courses, teachers, counselors, and administrators encouraged all students to pursue these challenging courses.

Every school in the district was required to meet the Southern Association of Colleges (SACS) accreditation standards and prepare a school improvement plan based on the school's individual needs. A committee of teachers, and in some cases teachers and administrators, prepared the plan, which addressed student achievement.

Anecdotal evidence stated in the 2000-01 CPMSA Annual Progress Report indicated that hands-on, inquiry-based instruction was occurring on a regular basis in the classrooms of CPMSA schools. Directors of the Alabama Science in Motion/Alabama State University kept accurate records of laboratory activity kits checked out to MPS science teachers. In addition, several CPMSA elementary schools maintained records to indicate the scheduled use of laboratory facilities by their teachers. Pre- and post-tests, as well as attitudinal surveys administered to teachers, reflected the increase of hands-on inquiry based *Activities Integrating Mathematics and Science* (AIMS) curricula materials. The steady refurbishment of *Full Option Science System* modules (FOSS kits) also indicated an increase in hands-on instruction. According to interviews with district teachers, AIMS instruction and FOSS kits were implemented extensively in the elementary grades.

The YMCA Camp Chandler and the MPS Arboretum provided additional means for students to obtain real-world relevant experience and enhanced their interest in science and mathematics. Camp Chandler provided a wilderness experience for students who had never been exposed to the natural environment. Under the direction of an instructor, students tested water quality, examined organisms, and engaged in a variety of activities, such as archery and orienteering, to learn mathematics and science. For example, students learned how to measure velocity and use a compass. Mr. Jeff Reynolds led the effort for the school district. The Arboretum consists of 32 acres of natural habitat dedicated to the study and enjoyment of plants and animals. Records of attendance at both facilities indicated an increase in student attendance in 2001.

Camp Chandler is a YMCA funded summer camp that has been in operation for over 70 years. It manages to stay open almost the entire calendar year while catering to campers ages 5-15. Some programs offered include Indian Guides, Teambuilding, Outdoor Education, Overnight Retreats, Water Skiing, Horseback Riding, and camps designed specially for every specific school break. Throughout all programs a strong emphasis is placed on preparing young people for the world by encouraging positive traits within their personalities from an early age.

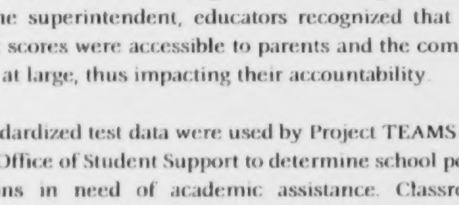
The **Montgomery Public School Arboretum** has served over 2,000 elementary students during the past 20 years. It is the system's only outdoor classroom and is comprised of 32 acres of open meadows and woodlands, a classroom building, and a large greenhouse. The meticulously kept site allows both children and teachers to learn about an ecosystem that does not exist in the city while bringing them closer to nature.

With the assistance of Project Teams, MPS began focusing on the integration of technology into the instructional process for all subjects, including mathematics and science. The district provided computers, and the technical department provided management and instruction in the use of technology.

MPS used the Stanford Achievement Test (SAT-9, grades 3-11) to measure student achievement in mathematics and science. They also relied on alternative assessment tools, such as student portfolios. Student profile sheets showing areas where students were proficient or weak in meeting the objectives of the SAT-9 were used extensively. All teachers received training in the interpretation of SAT-9 results through on-site training. According to the superintendent, educators recognized that student scores were accessible to parents and the community at large, thus impacting their accountability.

Standardized test data were used by Project TEAMS and the Office of Student Support to determine school populations in need of academic assistance. Classroom observation instruments were used to assess individual teacher needs and provide them with feedback on their ability to address various learning styles, use of alternative assessment, implementation of inquiry learning, and use of manipulatives.

During SY 2000-01, Project TEAMS employed its own data analyst. It was expected that data collection and interpretation would greatly improve over previous years. Project TEAMS staff worked with the system's technology services to implement a computer program that will allow the system to input, disaggregate, save, and retrieve data.



Children at Camp Chandler

STUDENT SUPPORT/ENRICHMENT PROGRAMS

MPS established several enrichment and support programs to eliminate barriers to success for all students. **Extended-day programs** offered students the opportunity to receive content remediation/enrichment, learn test-taking skills, and seek homework assistance. During SY 2000-01, 27 CPMSA schools utilized the extended-day program, reflecting almost a 100% increase over the number of schools that took advantage of the program in 1999-2000. Some students participated in external extended-day programs offered by non-profit organizations, such as Fathers Active in Children's Education (FACE).

Study Buddies was a locally-televised after-school call-in show that enabled students to ask questions and have the responses broadcast. Another locally produced weekly cable television show was **Techna Talk**, which focused on practical uses of, and promising careers in mathematics, science, and technology, in addition to spotlighting outstanding students.

In collaboration with the Montgomery Area Chamber of Commerce, MPS successfully supported the **School-to-Career** program. Students and teachers partnered with local businesses to provide students with real-world experiences. This program encouraged students to take upper-level courses and offered a mentoring component where students worked closely with a scientist, engineer, or mathematician.

A fine arts resource leader from the Office of Educational Improvement developed and implemented a program designed to integrate the arts into mathematics and science curricula through the use of body movements. Other student support programs included the **Alabama Partners-in-Education**, which consisted of local business leaders who provided individualized student assistance as needed, and the Planetarium that worked collaboratively with Project TEAMS.

Summer programs provided students with the needed support to eliminate academic weaknesses and increase interest in mathematics and science. Two summer programs included **Jump Start**, a two-week enrichment program for rising 7th and 9th grade students, implemented in four designated school sites, and **Get Ready**, a week-long program for rising seniors that gave them a head start on their college search, and included career counseling and financial aid information.

PROFESSIONAL DEVELOPMENT

The Montgomery Public School Professional Services Center offered ongoing teacher training throughout the year. Teachers were afforded four days' release time annually to receive professional development district-wide. One component of professional development was specifically designed to address individual school, teacher, and student needs based on criterion referenced and norm referenced data. Data such as the SAT-9 scores provided direction for professional development at the system level on common areas of need, as well as at the school level. Professional development workshops were held during the school week, on Saturdays, or during the summer.

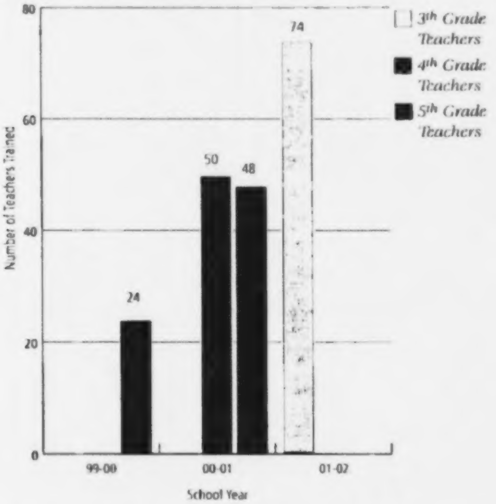
Mathematics and Science Resource Leaders promoted and modeled effective strategies to improve instruction. They provided guidance in the development and implementation of standards-based instruction and alternative assessment. Resource Leaders provided professional development for teachers on-site and district-wide, and served as liaisons between the Project TEAMS director and classroom teachers.

To receive accreditation through the Southern Association of Colleges and Schools, each employee was required to receive a minimum of 96 hours of professional development every five years. This standard exceeded the 50-hour minimum criteria established by the Alabama State Department of Education.

According to the CPMSA Project Director, all teachers in the MPS system received one day of in-service training during SY 1999-2000 specifically designed to help them implement standards and develop rubrics. In addition, 24 5th grade teachers received three days of intensive Hands-on Activities in Science Program training, based at the University of Alabama in Birmingham (ALAHASP), in the use of the *Full Option Science System* (FOSS) and the *Science and Technology for Children* (STC) modules. During SY 2000-01, 50 4th grade and 48 5th grade teachers received two days of intensive ALAHASP training and in SY 2001-02, 74 3rd grade teachers received two days of ALAHASP training. Figure 6.1 shows the number of teachers who received ALAHASP training between SY 1998-99 and SY 2000-01, by grade level.

Figure 6.1

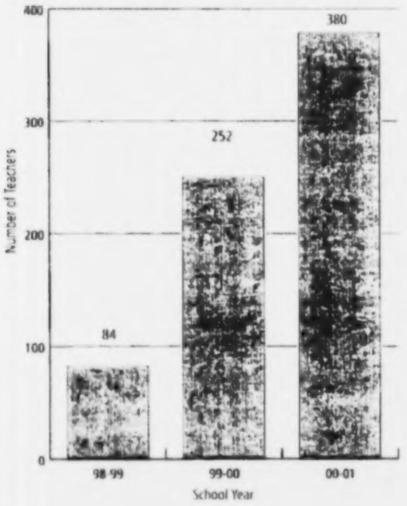
Alabama Hands-on Activities in Science Program (ALAHASP) Training



Faculty participation in Activities Integrating Mathematics and Science (AIMS) workshops increased between SY 1998-99 and SY 2000-01, according to the CPMSA 2000-01 Annual Report. As shown in Figure 6.2, during SY 1998-99, 84 teachers participated in AIMS workshops, while 252 and 380 teachers participated in SY 1999-2000 and SY 2000-01, respectively.

Figure 6.2

AIMS Workshop Participation



The CPMSA grant provided an opportunity for teachers to receive a stipend for attending AIMS and ALAHASP workshops. For each AIMS activity attended, teachers received $300 in hands-on manipulative instructional materials for their classrooms.

According to the 2000-01 MPS CPMSA revised annual report there were 53 CPMSA supported professional development activities/training sessions offered to MPS teachers during SY 2000-01 through the Professional Development Center. There were three system-wide programs, October 2000, February 2001, and August 2001. The October 2000 teacher in-service focused on individual school improvement, and implementation and utilization of the new curriculum frameworks. The February 2001 system-wide in-service was designed to meet individual teacher needs. Teachers were also required to attend at least one session on standards-based instruction and the development and use of rubrics. The August 2001 in-service program focused on textbook orientation, SAT-9 implementation and interpretation, and alignment of curricula with standards.

As a means of self-assessment, every teacher was required to complete and submit a state mandated Professional Development Plan (PDP) each year, based on the results of the teacher's Professional Educational Personnel Evaluation (PEPE). The PDP plan had to include professional development and student achievement goals. Principals performed teacher evaluations based on a minimum of two observations per year.

Superintendent Carter was instrumental in re-instating Instructional Supervisors, subsequently referred to as Educational Specialists. In SY 1999-00, 21 Educational Specialists were certified by the system-wide Instructional Assistance program. They worked with teachers on an individual basis as needed and served as the point of contact at the central office. These certified supervisors were supported by Title I funds and each supervisor was assigned to one or two Title I schools.

Approximately 80% of the CPMSA budget was dedicated to professional development. Therefore, effective teacher instruction was a major component of Project TEAMS. According to the CPMSA 2000-01 Annual Progress Report, classroom observations indicated that standards-based, inquiry-driven mathematics and science instruction was being implemented.

POLICY SUPPORT FOR HIGH QUALITY TEACHING AND LEARNING

The Alabama State Department of Education revised its standards for graduation by raising the standards on the Alabama High School Graduation Exam (AHSGE) from an eighth grade to an eleventh grade level. Standards for graduation also required students to take four courses each in mathematics, science, English, and social studies.

Several new state policies were implemented that had an impact on the quality of mathematics and science. Policies included:

- **Standards-based Curriculum**. The Alabama Courses of Study for mathematics and science were aligned with national standards. The alignment process for all subjects began in June 2000. The new Alabama Course of Study for science, which included several new science core electives, was implemented during SY 2002-03. The mathematics and science curriculum frameworks were aligned with state and national standards. The curriculum frameworks were tied to the requirements for the graduation exam.
- **Minimum graduation standards**. The Alabama State Department of Education mandated that beginning in SY 1996-97, all students entering ninth grade earn four mathematics units, including Algebra I, Geometry, and four science units, including biology and physical science. The increased requirements for graduation increased the enrollment in upper level mathematics and science courses.
- **Alabama High School Graduation Exam (AHSGE).** The level of mathematics and science content on the AHSGE increased from an 8th grade to an 11th grade level in SY 1996-97. Every student was required to pass the mathematics and science portions of the exam. Teachers were required to re-teach, and document, the objectives to every student who failed the mathematics or science component of the graduation exam.
- **Professional Development**. The Alabama State Department of Education mandated that teachers submit a Professional Development Plan each year beginning in SY 2000-01. In addition to functioning as a tool for self-improvement, the plan addressed areas of student achievement.

At the district level, establishing policies that supported high quality mathematics and science educational instruction indicated the commitment of MPS to improving achievement for all students. The superintendent and the Montgomery board of education endorsed Project TEAMS, which increased the focus on higher student expectations and standards in mathematics and science. District policies enacted in SY 2000-01 included:

- **Four-by-Four Block Schedule**. Students enrolled in four courses during each semester, which allowed them to earn eight credits each year.
- **Professional Development**. The MPS Office of Educational Improvement requested each school site to conduct a minimum of nine in-service sessions each academic year.

Although MPS did not have any policies to address achievement gap issues, students who scored low on the SAT-9 were targeted for extended-day and summer programs. Teachers also had the opportunity to address this area of concern. Twenty-seven extended day programs, which included mathematics and science, were instituted during SY 2000-01.

The School Board was very supportive of educational reform and programs that impacted improved student achievement. According to Margaret Carpenter, a board member who had served for 10 years, the School Board was instrumental in increasing system accountability by raising the mathematics and science content standards for the graduation exam. The Board also endorsed the four-by-four block system, aligning mathematics and science standards with national standards, and replacing lower-level courses with more challenging courses. According to the superintendent, Board members subscribed to students enrolling in challenging mathematics and science courses.

CONVERGENCE OF EDUCATIONAL RESOURCES

The Project TEAMS initiative achieved greater impact on improved mathematics and science education through the collaborative use of funds supporting the Montgomery Public School system. All reform initiatives were integrated and focused on the goal of improved student achievement. According to the superintendent, all reform initiatives supported each other, and the Montgomery Public School system was committed to continue the effort of improving mathematics and science instruction and student achievement after the CPMSA funding ended.

A number of funding sources converged to support reform in mathematics and science education. Sources that addressed the needs of individual schools and students included Title I funds, which provided financial assistance to schools with student populations meeting or exceeding 60% free or reduced lunch, and Title VI funds (Innovative Educational Strategies) that provided materials that promoted cooperative learning and higher-order thinking skills. The STAR SEARCH 21st Century Community Learning Centers provided afterschool and summer educational programs for students and communities at three city schools that had a 99% minority population, while the High Hopes program supported the Alabama High School Graduation Examination remediation.

Several programs were designed to improve technology literacy among students and teachers. These included Title III funds designed to integrate technology into the MPS learning standards, Goals 2000 designed to support science in technology, and Learn and Serve-ETHICS grants that addressed computer instruction and maintenance. The Title II funds (also called Eisenhower funds) provided additional instructional support in mathematics and science. During SY 2000-01, a portion of the funds was appropriated for the Professional Services Center where most of the non-site based professional development took place.

The Montgomery Education Foundation provided additional assistance to schools through the Schools for Thought grants, and local city councilmen often provided additional funding to schools in their districts that needed specific assistance.

PARTNERSHIPS: BROAD-BASED SUPPORT

One of the key components of effective implementation of Project TEAMS was the collaboration of MPS with higher education institutions, local businesses and industry, and community-based organizations. Higher education institution partners provided support in teacher training and hands-on instruction, and included Alabama State University (ASU), the University of Alabama at Birmingham (UAB), Auburn University (AU), Tuskegee University (TU), and Troy State University Montgomery (TSUM).

Alabama State University provided the Montgomery Public School system with several training and support programs that contributed to improved educational instruction and student achievement. During SY 2000-01, 14 secondary teachers participated in the 64-hour, four-week Teacher Training Program designed to enhance science pedagogical skills, computer skills, applied microbiology, and standards implementation. Trained teachers then shared the information with other teachers at their home schools. Another program offered by ASU was the Alabama Science in Motion, a two-week summer workshop for grade 10-12 science teachers on chemistry and biology, using state-of-the-art equipment, which was then delivered to the school for the trained teachers to perform the experiments in their classrooms. During SY 2000-01, six teachers were trained. Two other programs offered by ASU included the Health Careers Opportunity Program, a program designed to increase the number of students from ethnic minority and disadvantaged backgrounds entering health professions; and the Alliance for Minority Participation, a program whose goal is to increase the number of minorities receiving bachelor's degrees in science, engineering and mathematics.

The University of Alabama at Birmingham offered the Alabama Hands-on Activity Science Program (ALAHASP), which offered standards-based training and classroom support for 98 teachers during SY 2000-01 in the use of FOSS and STC modules.

Auburn University conducted Operation Chemistry and Operation Physics, an intensive, one-week summer training program based on incorporating hands-on activities and inquiry-based science instruction. **Tuskegee University** conducted Window on the Universe, a program that focused on learning about human and space sciences. During the spring of 2001, a team of NASA scientists trained 70 teachers from MPS and 30 teachers from the Tuskegee area, followed by classroom presentations to over 1,500 students. The W. Gayle Planetarium, operated by **Troy State University Montgomery**, was used as the location for the Window on the Universe Family Science Night.

Several businesses and industries supported the district's mathematics and science education through the donation of both store credit and actual merchandise. The **Montgomery Education Foundation** provided endowment grants to teachers who submitted excellent lessons. Selected teachers then provided professional development to other teachers and demonstrated exemplary lessons. The Foundation also sponsored school improvement grants and Partners in Education (professional scientists in the classroom).

MPS engaged several community-based organizations in providing teacher and student support. The **YMCA Camp Chandler** Wilderness Outdoor Education Program provided environmental education for 4th grade students. During SY 2000-01, 2,082 students participated in these standards-based, real-world activities. **Montgomery Water Works** provided students with an avenue to learn about aquifers and the water cycle, while the **Arboretum** provided a natural habitat to study and enjoy plants and animals. **Jumpstart**, a two-week summer science camp, enabled students to acquire mathematics and science skills through hands-on research activities and exposure to various career opportunities. Three academies, the Leadership Academy, the Mentoring Academy, and the Principal's Academy provided training and assistance to administrators and principals.

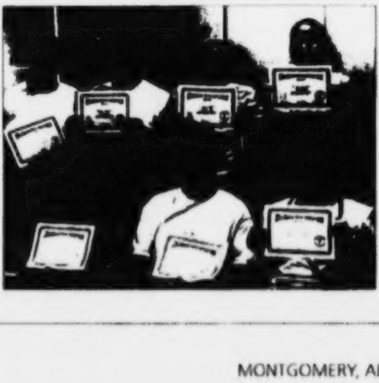
Local businesses and community organizations provided student support activities and leadership training. The broad-based support of higher education institutions and the community/businesses provided enrichment and growth opportunities to students, teachers, and administrators. The availability of all these programs and resources through the various partners enabled MPS to make significant strides in reaching their goal of more effective instruction that prepared students to pursue programs in SEM.

LEADERSHIP

As the principal investigator for Project TEAMS, Superintendent Carter provided his leadership and support for improved educational instruction and student achievement. Dr. Carter served the district beginning in 1999 and met regularly with the project director, who reported to the Assistant Superintendent of Curriculum and Instruction. According to Superintendent Carter, MPS recognized the gap in achievement between White and underrepresented minority students, particularly in mathematics and science. Project TEAMS focused on higher student expectations, improved instruction, and student support, with the purpose of closing the gap. Dr. Carter indicated his commitment to continue the convergence of all resources to raise the achievement of all students.

Leadership for Project TEAMS was also provided by the project director, Ms. Tina Bowlin, who assumed leadership at the beginning of the fourth year of the CPMSA funding period (August 2001). Ms. Bowlin's predecessor, Mr. Daniel Boyd, was the project director during the first three years (beginning in SY 1998-99). According to Ms. Bowlin, the major focus of Project TEAMS was bridging the achievement gap between minority and non-minority students in mathematics and science, with particular attention given to student course enrollment, student assessment/evaluation, and professional development. Ms. Bowlin worked closely with the Department of Curriculum and Instruction (previously the office of Educational Improvement) and the school coordinators to oversee the day-to-day activities. Each participating school had a resource leader/coordinator for Project TEAMS.

In addition to promoting and modeling effective strategies to improve instruction, the mathematics and science resource leaders served as a communication link between the Project TEAMS director and teachers. Resource leaders provided on-site and district-wide professional development in mathematics and science.



STUDENT ACHIEVEMENT

The extent to which Project TEAMS impacted student achievement was determined by changes in student enrollment in, and completion of gate-keeping and upper-level mathematics and science courses; SAT-9 mathematics and science assessment results; ACT, SAT, and AP test scores; and participation in support and enrichment programs.

Improved Enrollment and Completion of Mathematics and Science Courses

Three of the nine Project TEAMS goals addressed the enrollment and successful completion of gate-keeping and upper-level courses critical to student success in pursuing SEM programs. Upper-level and gate-keeping mathematics courses included Algebra I, Algebra II with Trigonometry, Math Analysis (Pre-Calculus), and Calculus, while upper-level science courses included Biology, Chemistry, and Physics above the introductory level. Following is a summary of student progress according to each of the three goals.

GOAL 1. Double the number of students enrolling in and successfully completing advanced gate-keeping mathematics and science courses.

Mathematics gate-keeping courses were defined as Algebra I and II, Trigonometry/Pre-Calculus, and Calculus. Science gate-keeping courses were defined as Biology, Chemistry, and Physics.

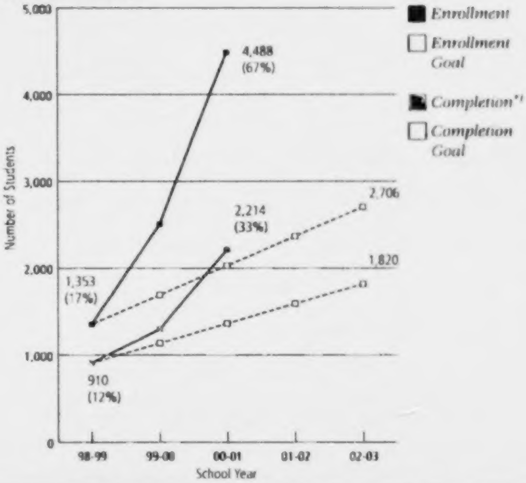
Figure 6.3 illustrates gate-keeping mathematics and science enrollment and completion trends for all students in grades 9-12, beginning with SY 1998-99, the first year of CPMSA implementation. Mathematics enrollment increased from 1,353 students (17% of the total enrollment of grades 9-12) to 4,488 students (67%) between SY 1998-99 and 2000-01. Completion rates also increased over this period. The number of students who successfully completed gate-keeping mathematics courses with a grade of C or higher increased from 910 (12%) to 2,214 (33%) between SY 1998-99 and 2000-01. The mathematics course enrollment and completion goals were exceeded.

Enrollment in gate-keeping science courses increased from 1,139 students (14%) to 1,768 students (26%) between SY 1998-99 and 2000-01. The number of students who successfully completed these courses rose from 607 students to 940 students (21%) for this same period. The interim goals for science enrollment and completion have been met.

Figure 6.3

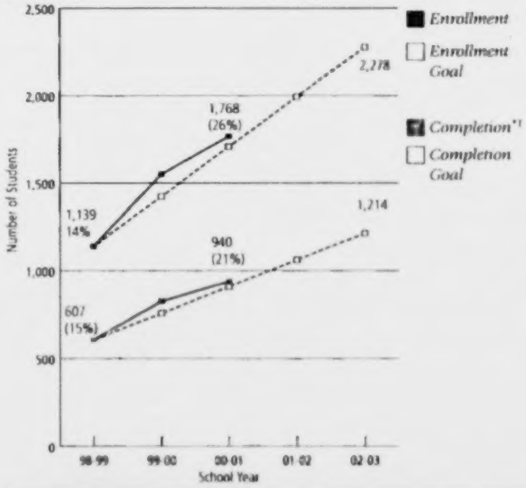
Gate-keeping Mathematics and Science Enrollment and Completion Trends for All Students in Grades 9-12

Mathematics



SY	98-99	99-00	00-01	01-02	02-03
Enrolled	1,353	2,505	4,488	•	•
Completed	910	1,299	2,214	•	•
Enrollment Goal	1353	1,691	2,029	2,367	2,706
Completion Goal	910	1,138	1,364	1,592	1,820

Science



SY	98-99	99-00	00-01	01-02	02-03
Enrolled	1,139	1,552	1,768	•	•
Completed	607	828	940	•	•
Enrollment Goal	1,139	1,424	1,709	1,994	2,278
Completion Goal	607	759	911	1,063	1,214

Mathematics Courses: Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus
Science Courses: Biology, Chemistry and Physics
*1 Successful completion: grade 'C' or above.
(%): Percentage of total G9-12 student population

Table 6.1 shows the passing rates for all gate-keeping and higher-level mathematics and science courses.

Table 6.1

Passing Rates of Gate-Keeping and Higher-Level Courses by All Students

SY	98-99	99-00	00-01
Mathematics	67%	52%	49%
Science	53%	53%	53%

GOAL 2. Double the enrollment of underrepresented minority students in advanced mathematics and science courses.

As seen in Figure 6.4, underrepresented minority student mathematics enrollment grew from 833 students (14%) in SY 1998-99 to 3,099 students (60%) by SY 2000-01. The number of students successfully completing gate-keeping mathematics courses with a grade of C or higher increased from 501 (6%) to 1,417 (21%) during the same time period. Goal 2 was far exceeded for mathematics course enrollment and completion.

In science, enrollment increased from 895 underrepresented minority students (15%) in SY 1998-99 to 1,058 students (21%) in SY 2000-01. The number of students successfully completing gate-keeping science courses fell slightly from 455 students (8%) in SY 1998-99 to 367 students (7%) by SY 2000-01. Figure 6.4 shows gate-keeping mathematics and science enrollment and completion trends for underrepresented minority students in grades 9-12 from SY 1998-99 and 2000-01. Progress was made towards the science gate-keeping course enrollment goal, but not yet attained; course completion remains a challenge.

Table 6.2 indicates the passing rates of underrepresented minority students in gate-keeping and higher-level mathematics and science courses.

Table 6.2

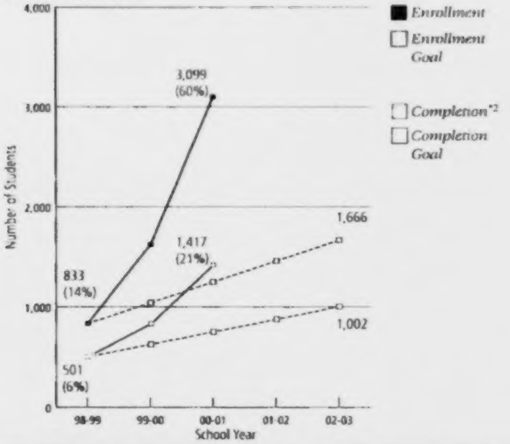
Passing Rates of Gate-Keeping and Higher-Level Courses by Underrepresented Minority Students

SY	98-99	99-00	00-01
Mathematics	60%	50%	46%
Science	51%	53%	35%

Figure 6.4

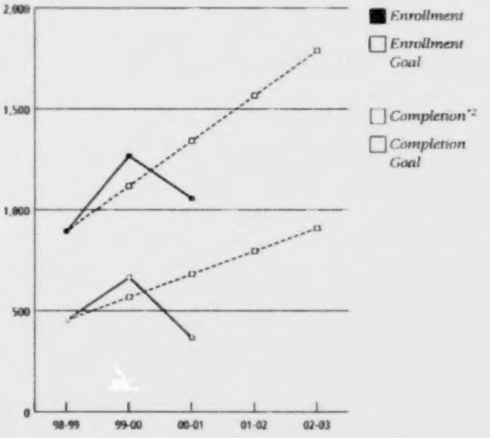
Gate-keeping Mathematics and Science Enrollment and Completion Trends for Underrepresented Minority Students[*1] in Grades 9-12

Mathematics



SY	98-99	99-00	00-01	01-02	02-03
Enrolled	833	1,624	3,099	•	•
Completed	501	831	1,417	•	•
Enrollment Goal	833	1,041	1,249	1,457	1,666
Completion Goal	501	626	751	876	1,002

Science



SY	98-99	99-00	00-01	01-02	02-03
Enrolled	895	1,269	1,058	•	•
Completed	455	667	367	•	•
Enrollment Goal	895	119	1,343	1,567	1,790
Completion Goal	455	569	683	797	910

Mathematics Courses: Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus

Science Courses: Biology, Chemistry and Physics

[*1] Underrepresented Minority Students: American Indian/Alaskan Native, Black, and Hispanic

[*2] Successful Completion: grade C or above

(%): Percentage of total G9-12 student population

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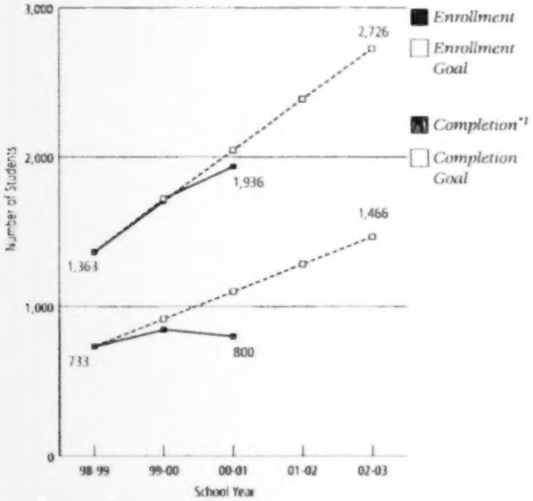
GOAL 3. Double the number of graduates who successfully complete Physical Science by the end of the 9th grade.

Figure 6.5 shows science enrollment and completion trends for all students in grade 9. The data indicate that Physical Science course enrollment increased from 1,363 to 1,936 between SY 1997-98 and 2000-01. The number of students completing the courses rose from 733 in SY 1998-99 to 800 by SY 2000-01. The goal of doubling the number of ninth grade students completing Physical Science was not achieved.

Figure 6.5

Physical Science Enrollment and Completion Trends For All Students in Grade 9



SY	98-99	99-00	00-01	01-02	02-03
Enrolled	1,363	1,719	1,933	•	•
Completed	733	854	800	•	•
Enrollment Goal	1,363	1,704	2,045	2,386	2,726
Completion Goal	733	916	1,099	1,282	1,466

*1 Successful Completion: grade C or above

Standardized Assessment Tests

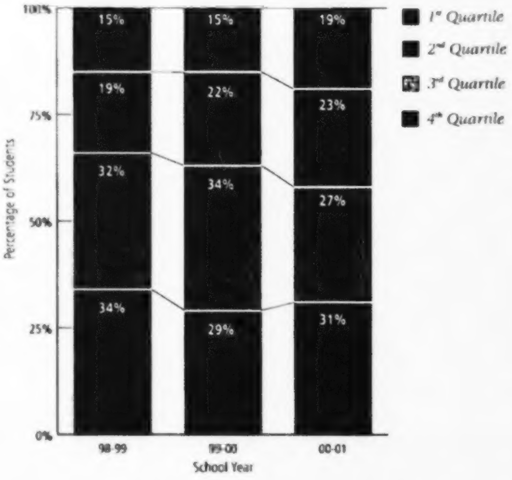
GOAL 7. Raise student performance in mathematics and science achievement to national and state levels as measured by the Stanford Achievement Test (SAT-9) series.

Data from the state assessment test—the Stanford Achievement Test, Ninth Edition (SAT-9)—were available for grades 4, 8, and 10 in mathematics and science for the 44 schools actively participating in Project TEAMS.

Figures 6.6–6.8 show SAT-9 results trends in mathematics for CPMSA schools between SY 1998-99 and SY 2000-01. Percent passing was defined as 1st and 2nd quartiles.

Figure 6.6

SAT-9 Result Trends in Mathematics (CPMSA Schools): Grade 4



Passing is defined as 1st and 2nd Quartiles

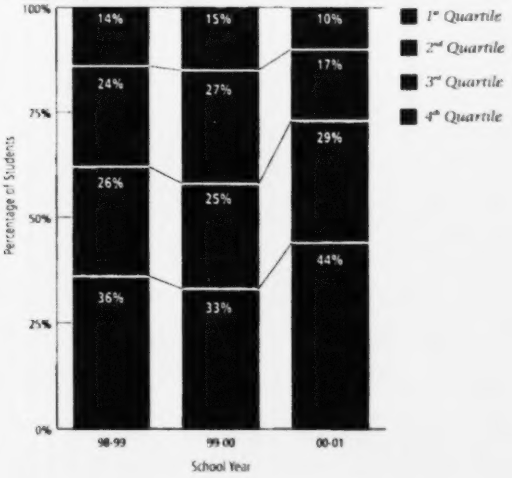
(%): Percentage of total number of test takers for specified grade

Figure 6.6 indicates that the number of fourth grade mathematics students scoring in the top two quartiles on the SAT-9 increased by 8pp from 34% to 42% between SY 1998-99 and 2000-01.

Figure 6.7 shows a drop in the percentage of eighth grade students scoring in the top two quartiles. The percentage of these students fell 11pp from 38% in SY 1998-99 to 27% by SY 2000-01.

Figure 6.7

SAT-9 Result Trends in Mathematics (CPMSA Schools): Grade 8

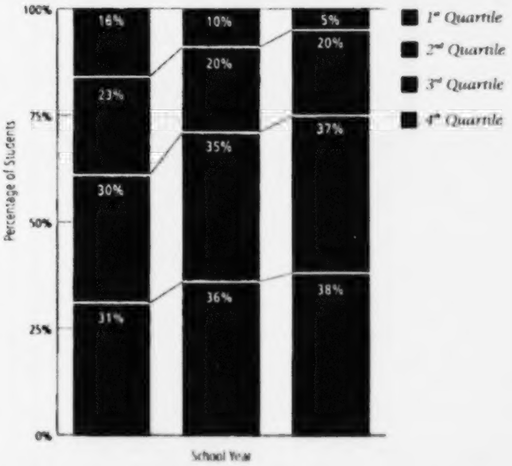


Passing is defined as 1st and 2nd Quartiles
(%): Percentage of total number of test takers for specified grade

As shown in Figure 6.8 SAT-9 result trends in tenth grade mathematics revealed a substantial drop in the percentage of students passing. Tenth grade passing rates fell 14pp from 39% to 25% passing between SY 1998-99 and 2000-01.

Figure 6.8

SAT-9 Result Trends in Mathematics (CPMSA Schools): Grade 10

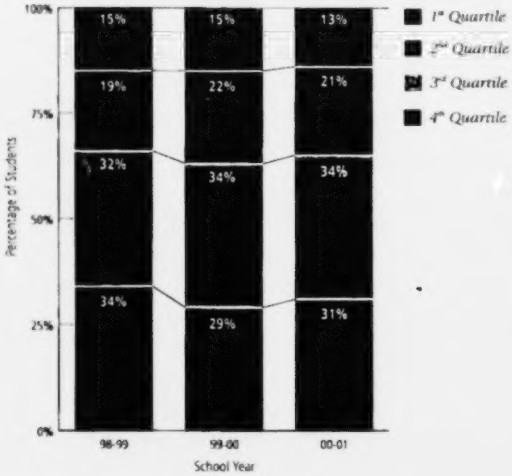


Passing is defined as 1st and 2nd Quartiles
(%): Percentage of total number of test takers for specified grade

SAT-9 result trends in science for CPMSA schools between SY 1998-99 and 2000-01 are illustrated in Figures 6.9 - 6.11.

Figure 6.9

SAT-9 Result Trends in Science (CPMSA Schools): Grade 4



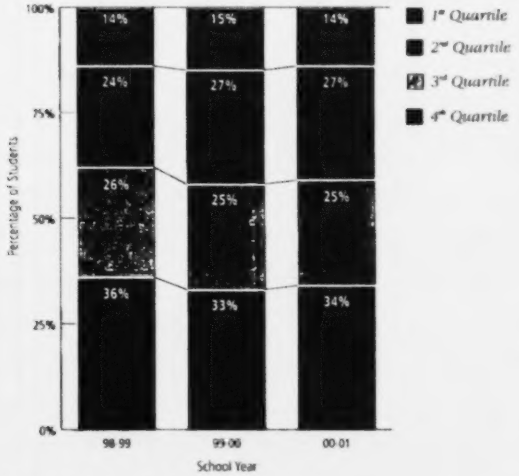
Passing is defined as 1st and 2nd Quartiles
(%): Percentage of total number of test takers for specified grade

The outcomes of the fourth grade SAT-9 tests were stable between SY 1998-99 and 2000-01, with students passing rates remaining at 34% in both SY 1998-99 and SY 2000-01.

A similar trend is observed in the eighth grade science results. Figure 6.10 reveals a generally stable passing rates trend with a 4pp drop from 37% to 33% between SY 1998-99 and 2000-01.

Figure 6.10

SAT-9 Result Trends in Science (CPMSA Schools): Grade 8

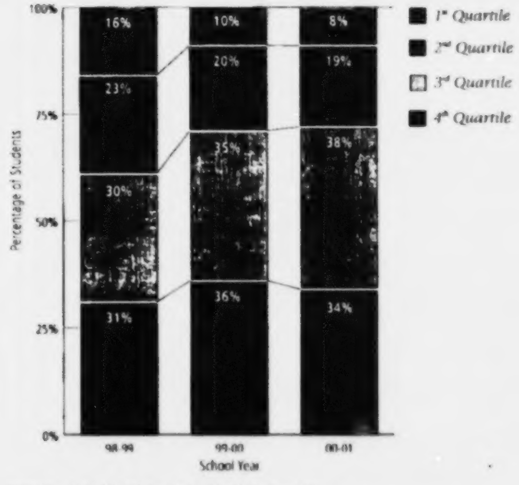


Passing is defined as 1st and 2nd Quartiles
(%): Percentage of total number of test takers for specified grade

Tenth grade science results show a significant decline in passing rates from SY 1998-99 to 2000-01. Figure 6.11 indicates that the percentage of students passing in grade 10 fell 12pp from 39% to 27% between SY 1998-99 and SY 2000-01.

Figure 6.11

SAT-9 Result Trends in Science (CPMSA Schools): Grade 10



Passing is defined as 1st and 2nd Quartiles
(%): Percentage of total number of test takers for specified grade

Other indicators of progress in mathematics and science not specifically addressed in the goals include Algebra in 8th grade enrollment and completion, the percentage of 12th grade students graduating, the number of graduating students deemed SEM proficient, and college entrance exam results.

Other indicators of student achievement, not specifically addressed in the goals include Algebra in the 8th grade enrollment and completion, high school graduation data, and college entrance exam results.

Algebra in 8th Grade

Enrollment and completion of Algebra I in 8th grade increased steadily during the CPMSA grant period. Figure 6.12 shows Algebra I in 8th grade enrollment and completion trends for all students, and for underrepresented minority students in the 44 schools participating in Project TEAMS from SY 1998-99 to 2000-01.

Algebra I enrollment for all students in eight grade increased 1pp from 223 (11%) in SY 1998-99 to 249 (12%) in SY 2000-01. Underrepresented minority student enrollment increased 3pp from 132 (8%) to 181 (11%) during the same time period. Completion rates also increased 1pp from 167 (8%) to 177 (9%) for all students, compared to 2pp 101 (6%) to 125 (8%) for underrepresented minority students.

High School Graduation

The Alabama State Department of Education mandated that every graduating student earn a minimum of four credits each in mathematics and science and pass the Alabama High School Graduation Exam. High school graduation requirements included:

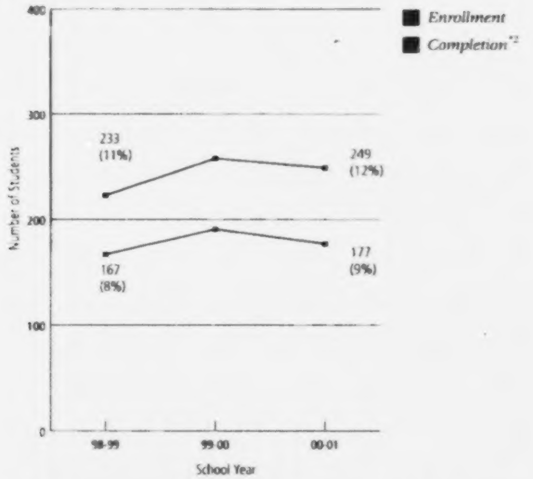
- Mathematics: Four credits to include the equivalent of Algebra I and Geometry and two electives
- Science: Four credits to include the equivalent of Biology and a physical science, and an additional Life and/or Physical Science

As illustrated in Figure 6.13 (see page 119), ninety-one percent (1,348 of the 1,481) 12th grade students who enrolled in SY 2000-01 earned a diploma.

Figure 6.12

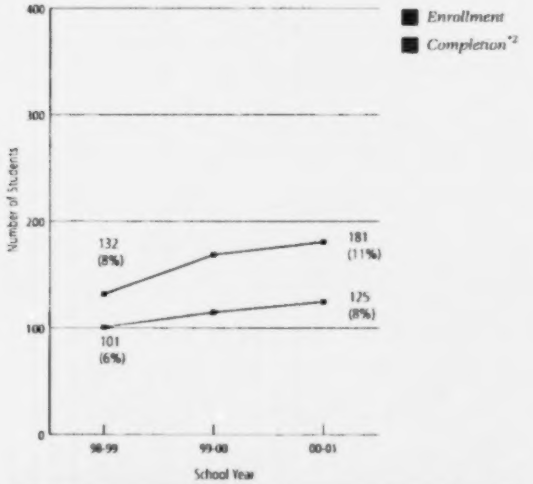
Algebra I in 8th Grade Enrollment and Completion Trends for All Students and for Underrepresented Minority Students*1 in CPMSA Schools

All Students



SY	98-99	99-00	00-01
Enrolled	233	258	249
Completed	167	191	177

Underrepresented Minority Students



SY	98-99	99-00	00-01
Enrolled	132	169	181
Completed	101	115	125

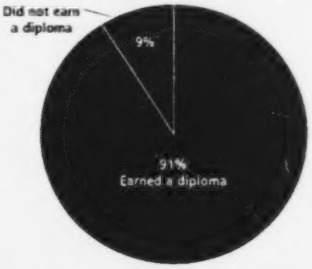
*1 Underrepresented Minority Students: American Indian/Alaskan Native, Black, & Hispanic

*2 Successful completion: Grade C or above

(%) Percentage of total enrollment for specified grade(s) and/or Race/Ethnicity

Figure 6.13

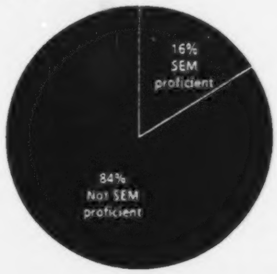
Percent of Total 12th Grade Students who Earned a Diploma in SY 2000-01



Students in MPS were also afforded the opportunity to earn an Advanced Diploma. In addition to satisfying the mathematics and science graduation requirements for the regular diploma, students had to complete Algebra II/Trigonometry and advanced level courses in the core curriculum. For example, a student seeking an advanced diploma had to complete college preparatory biology rather than regular biology. SEM proficiency was defined as high school graduates who had earned an Advanced Diploma. As shown in Figure 6.14 16% of 12th grade students (CPMSA schools) were SEM proficient in 2000-01.

Figure 6.14

Percent of High School Graduates SEM Proficient in SY 2000-01



College Entrance Exam Results

College entrance exam results, including the American College Test (ACT), the Scholastic Achievement Test (SAT), and the Advanced Placement (AP) tests, were analyzed as indicators of college preparation for the period SY 1997-98 to 2001-02.

American College Test (ACT)

The American College Test (ACT) scores revealed mixed results. As seen in Figure 6.15 (see page 120), there was a slight decrease in the mathematics mean score for all students, from 19.9 in SY 1997-98 to 19.0 in SY 2001-02. The average scores for African Americans

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decreased by 0.4 points from 17.6 in SY 1997-98 to 17.2 in SY 2001-02, and remained lower than the scores for all other ethnic groups.

ACT science scores followed similar trends. As seen in Figure 6.16 (see page 121), there was a slight decrease in the science mean scores for all students, from 20.1 in SY 1997-98 to 19.8 in SY 2001-02. However, there was a slight increase among females during the same time period (18.8 to 19.2), although their scores were slightly lower than those of their male counterparts. While the average scores for African Americans were maintained over the same time period (17.9 in SY 1997-98 to 18.0 in SY 2000-01), they remained lower than the scores for other ethnic groups.

Scholastic Achievement Test (SAT)

Scholastic Achievement Test (SAT) mathematics data for the period SY 1997-98 to SY 2001-02 were analyzed by gender and ethnicity. As shown in Figure 6.17 (see page 121), there was a 58-point decrease in the mean score for all students, from 533 in SY 1997-98 to 485 in SY 2001-02, with scores for males 22 points higher than females (495 to 473) in SY 2000-01. The average scores for African Americans decreased by 51 points from 480 in SY 1997-98 to 429 by SY 2001-02: scores for African American students remained lower than the scores for all other ethnic groups.

Advanced Placement (AP) Tests

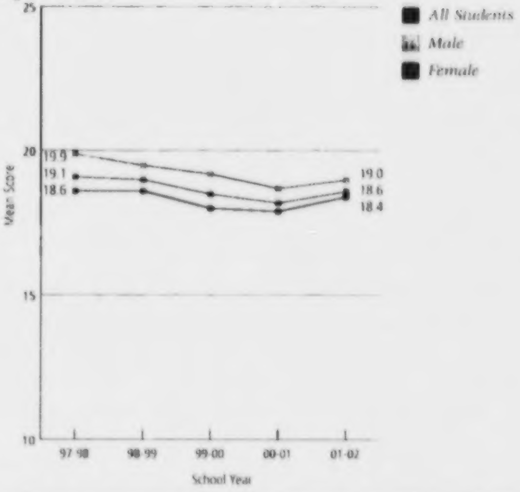
Figure 6.18 (see page 122) shows that the number of male and female students scoring 3 or above on the Advanced Placement mathematics test was comparable between 1998 and 2002. The number of underrepresented minority students scoring 3 or above was stable over this period but was consistently lower than for White students.

In AP science, the number of White students scoring 3 or above was larger than that of underrepresented minority students in both 1998 and 1999. However, Figure 6.19 (see page 122) shows comparable trends over the remaining three years (2000, 2001, and 2002). With respect to gender, the number of students scoring 3 or above in AP dropped from 12 and 6 for males and females respectively in 1998 to zero for both by 2001.

Figure 6.15

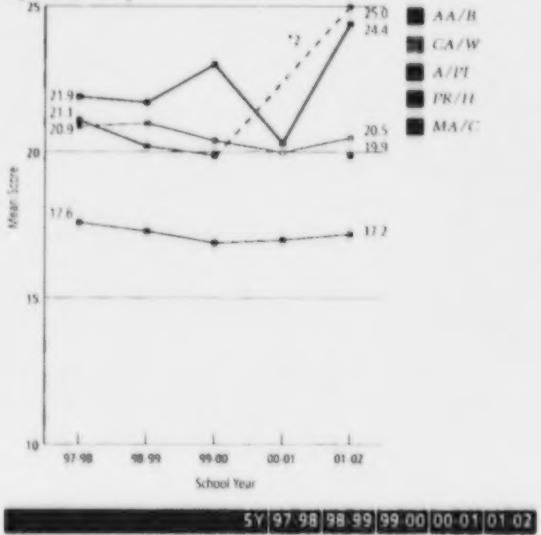
ACT Mathematics Mean Score Trends

by Gender



SY	97-98	98-99	99-00	00-01	01-02
All	19.1	19.0	18.5	18.2	18.6
Male	19.9	19.5	19.2	18.7	19.0
Female	18.6	18.6	18.0	17.9	18.4

by Ethnicity*1



SY	97-98	98-99	99-00	00-01	01-02
African American/Black	17.6	17.3	16.9	17.0	17.2
Amer. Indian/Alaskan Nat.	•	•	•	•	•
Asian/Pacific Islander	21.9	21.7	23.0	20.3	24.4
Caucasian American/White	20.9	21.0	20.4	20.0	20.5
Mexican American/Chicano	•	•	•	•	19.9
Puerto Rican/Hispanic	21.1	20.2	19.9	•	25.0

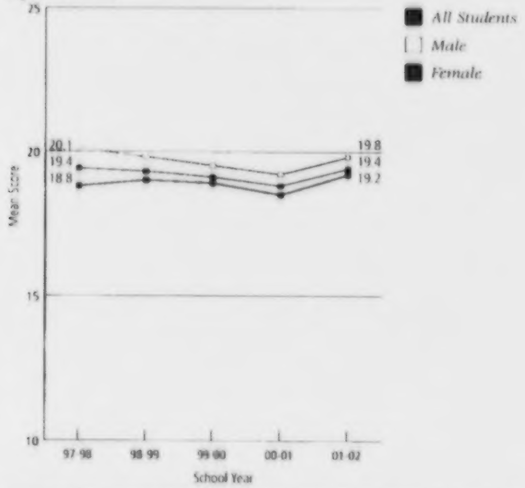
*1 AA/B: African American/Black; AI/AN: American/Alaskan Native; CA/W: Caucasian American/White; MA/C: Mexican American/Chicano; A/PI: Asian/Pacific Islander; PR/H: Puerto Rican/Hispanic

*2 Data not available for 2000-01; sample size less than 5

Figure 6.16

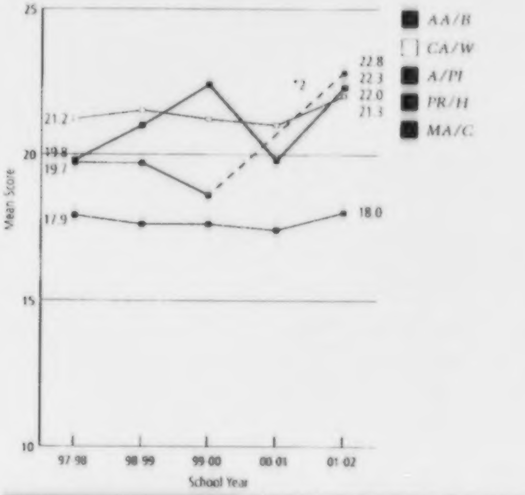
ACT Science Reasoning Mean Score Trends

by Gender



SY	97-98	98-99	99-00	00-01	01-02
All	19.4	19.3	19.1	18.8	19.4
Male	20.1	19.8	19.5	19.2	19.8
Female	18.8	19.0	18.9	18.5	19.2

by Ethnicity[*1]



SY	97-98	98-99	99-00	00-01	01-02
African American/Black	17.9	17.6	17.6	17.4	18.0
Amer. Indian/Alaskan Nat.	•	•	•	•	•
Asian/Pacific Islander	19.8	21.0	22.4	19.8	22.3
Caucasian American/White	21.2	21.5	21.2	21.0	21.3
Mexican American/Chicano	•	•	•	•	22.0
Puerto Rican/Hispanic	19.7	19.7	18.6	•	22.8

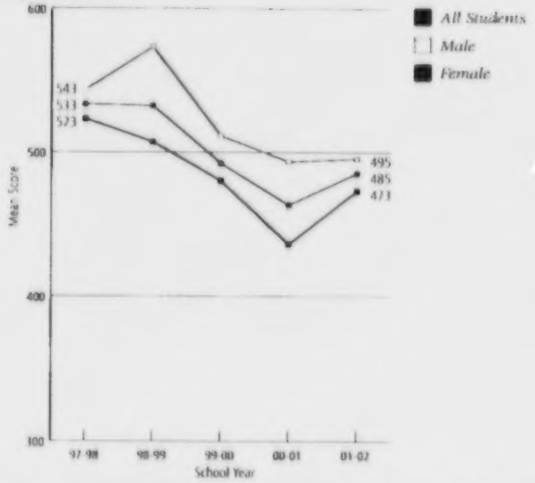
[*1] AA/B: African-American/Black AI/AN: American Indian/Alaskan Native CA/W: Caucasian American/White MA/C: Mexican American/Chicano A/PI: Asian/Pacific Islander PR/H: Puerto Rican/Hispanic.

[*2] Data not available for sample size less than 5 in 2000-01

Figure 6.17

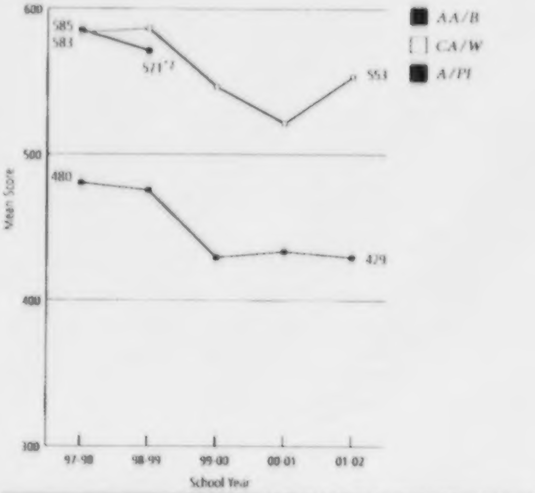
SAT Mathematics Mean Score Trends

by Gender



SY	97-98	98-99	99-00	00-01	01-02
All	599	532	492	463	485
Male	543	573	511	493	495
Female	523	507	480	436	473

by Ethnicity[*1]



SY	97-98	98-99	99-00	00-01	01-02
Amer. Indian/Alaskan Nat.	•	•	•	•	•
Asian/Pacific Islander	585	571	•	•	•
Black/African American	480	475	429	433	429
Hispanic/Latino	•	•	•	•	•
White	583	586	546	521	553
Others	•	•	•	•	•

[*1] A/PI: Asian /Pacific Islander B/AA: Black/African American W: White

[*2] Data not available for sample size less than 5 from 1998-99 to 2001-02

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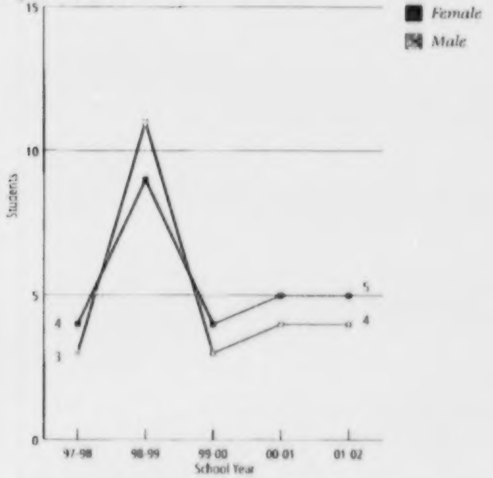
Figure 6.18

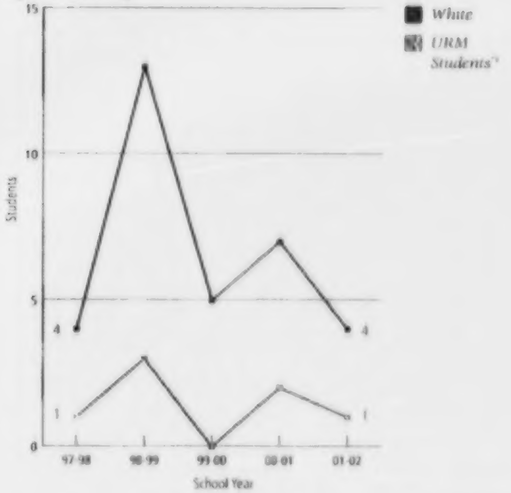
Number of Students Scoring 3 or Above in AP Mathematics

by Gender



	1998	1999	2000	2001	2002
Male	3	11	3	4	4
Female	4	9	4	5	5

by Ethnicity



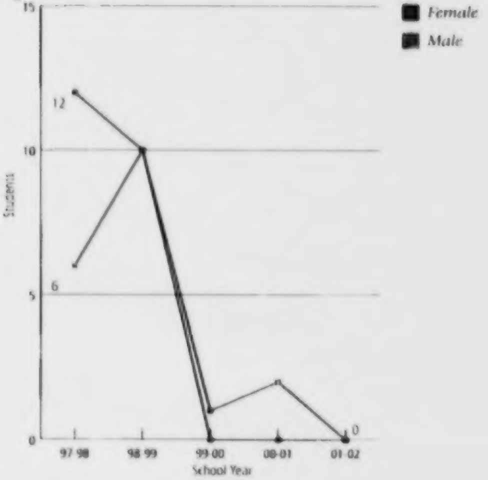
	1998	1999	2000	2001	2002
Amer. Indian/Alaskan Nat.	0	0	0	0	0
Asian/Pacific Islander	1	3	0	0	4
Black/African American	1	3	0	2	1
Hispanic/Latino	0	0	0	0	0
White	4	13	5	7	4

[1] Underrepresented Minority Students include American Indian/Native Alaskan, Black or African American, and Hispanic or Latino

Figure 6.19

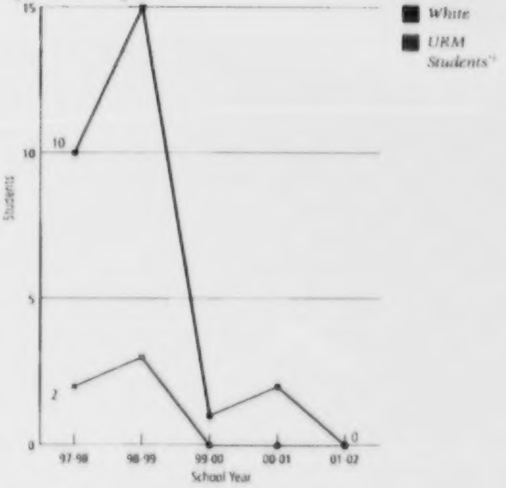
Number of Students Scoring 3 or Above in AP Science

by Gender



	1998	1999	2000	2001	2002
Male	6	10	1	2	0
Female	12	10	0	0	0

by Ethnicity



	1998	1999	2000	2001	2002
Amer. Indian/Alaskan Nat.	0	0	0	0	0
Asian/Pacific Islander	2	1	0	0	0
Black/African American	1	1	0	0	0
Hispanic/Latino	1	2	0	0	0
White	10	15	1	2	0

[1] Underrepresented Minority Students include American Indian/Native Alaskan, Black or African American, and Hispanic or Latino

CONCLUSION

Project TEAMS has driven a number of system-wide reforms in the Montgomery Public Schools. Mathematics and science reform efforts in Montgomery were designed to accomplish several fundamental objectives, including: raising student expectations, improving teacher performance, and providing students with support in mathematics and science.

Before Project TEAMS was implemented in Montgomery in SY 1998-99, Montgomery Public School student enrollment in gate-keeping and advanced mathematics and science courses was low and student achievement was well below national norms. Administrators believed this was due in part to inadequate instructional practices, a weak curriculum, lack of teaching materials, ineffective professional development programs, and a shortage of student support programs. Project TEAMS set out to address these issues and by the third year of CPMSA implementation, Montgomery has been able to show some solid evidence that they are making progress towards these objectives.

Curricular reform had two primary objectives: establish and support a standards-based mathematics and science curriculum and "raise standards" for student's performance. Montgomery Public Schools achieved success in both areas. During CPMSA implementation, mathematics and science curricula were fully aligned with state and national standards and teachers received training in standards-based instruction. Additionally, administrators cite the CPMSA project as having a significant impact on the implementation of a more rigorous mathematics and science curriculum. During the grant period, Montgomery Public Schools were able to eliminate several "watered-down" courses and replace them with more rigorous courses. For example, Algebra I replaced Algebra I A and B and Algebra II/Trigonometry replaced Algebra II. Consumer Mathematics was eliminated and a course in statistics was added. In addition, ninth grade Integrated Science was replaced with Physical Science.

The Montgomery Public Schools also established several enrichment and support programs to enhance mathematics and science. For example, during SY 2000-01, 27 CPMSA schools took part in an extended-day program, reflecting an almost 100% increase over the number of schools that utilized the program in 1999-2000.

Improving professional development offering were also a fundamental objective of Montgomery's vision of reform. Professional development reform was geared toward improving teaching strategies. All of MPS teachers received one day of in-service training during SY 1999-00 specifically designed to help them implement standards and develop rubrics. In addition, 24 5th grade teachers received three days of intensive Hands-on Activities in Science Program training, based at the University of Alabama in Birmingham (ALA-HASP), in the use of the Full Options Science System (FOSS) and the Science and Technology for Children (STC) modules.

Partnerships with higher education institutions, local businesses and industry, and community-based organizations were a vital component of the Montgomery CPMSA. A number of college and university partners provided integral support in the area of professional development. For example, Alabama State University supported the Montgomery Public School system with several training and support programs that contributed to enhanced educational instruction and student achievement. Other partners included the University of Alabama at Birmingham (UAB), Auburn University (AU), Tuskegee University (TU), and Troy State University Montgomery (TSUM).

Student achievement data showed mixed results over the first three years of CPMSA implementation. Enrollment and successful completion of gate-keeping mathematics and science courses increased for all students between SY 1998-99 and SY 2000-01. Mathematics enrollment increased 50 percentage points (pp) from 1,353 students (17% of the total population of grades 9-12 students) to 4,488 students (67%) between SY 1998-99 and 2000-01. Additionally, mathematics completion rates also increased over this period; between SY 1998-99 and 2000-01 the number of students who successfully completed gate-keeping mathematics courses with a grade of C or higher increased 21pp from 12% of the total student population to 33%. Positive trends were also seen in science, as science enrollment increased by 12pp from 14% of students to 26% of students between SY 1998-99 and 2000-01. The number of students who successfully completed gate-keeping science courses rose 6pp from 15% of the student to 21% of the students.

The outcomes of the Stanford Achievement Test (SAT-9) show a general reduction in mathematics and science passing rates between SY 1998-99 and 2000-01. With the exception of fourth grade mathematics, which improved by 4pp, and fourth grade science, which saw no change, all other grades in mathematics and science experienced a drop-off in the number of students scoring in the top two quartiles. American College Test (ACT) scores revealed mixed results. The number of test takers increased indicating increasing interest by students in attending college. The average scores for African American students decreased by 0.4 points from SY 1997-98 to SY 2001-02. The Montgomery Public Schools made considerable progress in accomplishing the goals and objectives of Project TEAMS. Overall, enrollment and successful completion in gate-keeping mathematics and science courses increased for all students between SY 1998-99 and SY 2000-01. The mathematics and science curricula were aligned with state and national standards and teachers received training in standards-based instruction. In addition to district-wide professional development, the CPMSA initiative provided the resources for on-site teacher training in implementing standards and hands-on activities. The District established policies that supported high quality mathematics and science educational instruction, including minimum graduation standards, increasing the mathematics and science content level of the Alabama High School Graduation Exam from an 8th grade to an 11th grade level, and establishing the four-by-four block schedule. Several funding sources converged to support reform in mathematics and science education. Higher education institutes as well as local businesses and community organizations provided enrichment and growth opportunities to students, teachers, and administrators.

While student achievement did not improve significantly over the period of CPMSA implementation, there was slow but steady improvement. Project TEAMS was the impetus for continuous progress in mathematics and science instruction that was data-driven and focused on improved achievement for all students. With the establishment of a five-year strategic plan (2002-05), the Montgomery Public School system was committed to ensure that "each student achieves his or her highest academic and individual potential through a student-centered educational system distinguished by students, parents, and educators who are valued and have unlimited opportunities to learn and grow in a safe, caring environment supported by an involved, collaborative community."

Appendix

CPMSA OVERALL STUDENT OUTCOMES

A.1 Number of Students Enrolled in CPMSA Districts: SY 1993-94 to SY 2000-01
A.2 Number of Students and Schools in CPMSA Districts: (SY 2000-01)
A.3 Underrepresented Minority Students' Enrollment and Completion in G9-12 Mathematics Gate-Keeping and Higher Level Courses from Year 1 to SY 2000-01
A.4 Underrepresented Minority Students' Enrollment and Completion in G9-12 Science Gate-Keeping and Higher Level Courses from Year 1 to SY 2000-01
A.5 G9-12 Gate-Keeping and Higher-Level Mathematics Course Completion Percentage and Disparity Among Underrepresented Minority and White Students Between Comparison Years
A.6 G9-12 Gate-Keeping and Higher-Level Science Course Enrollment Percentage and Disparity Among Underrepresented Minority and White Students Between Comparison Years
A.7 G9-12 Gate-Keeping and Higher-Level Science Course Completion Percentage and Disparity Among Underrepresented Minority and White Students Between Comparison Years
A.8 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1993-94 to SY 2000-01: Cohort 1993
A.9 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1995-96 to SY 1997-98: Cohort 1994
A.10 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1995-96 to SY 2000-01: Cohort 1995
A.11 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1995-96 to SY 2000-2000-01: Cohort 1996
A.12 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1996-97 to SY 2000-01: Cohort 1997
A.13 Enrollment Disparity Trends in G9-12 Mathematics and Science Courses from SY 1998-99 to SY 2000-01: Cohort 1998
A.14 Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1993-94 to SY 2000-01: Cohort 93 Sites
A.15 Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1994-95 to SY 2000-01: Cohort 94 Sites
A.16 Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1995-96 to SY 2000-01: Cohort 95 Sites
A.17 Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1996-97 to SY 2000-01: Cohort 97 Sites
A.18 Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1997-98 to SY 2000-01: Cohort 98 Sites
A.19 Algebra I in 8th Grade Enrollment Disparity Among Largest Underrepresented Minority and White Students Between Comparison Years
A.20 Algebra I in 8th Grade Completion Gap Among Largest Underrepresented Minority and White Students Between Comparison Years
A.21 8th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Underrepresented Minority and White Students Between Comparison Years
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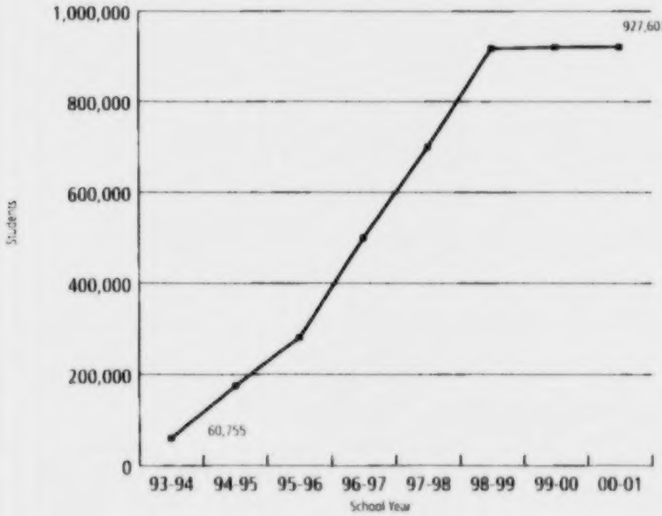
A.23 10th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Underrepresented Minority and White Students Between Comparison Years
A.24 10th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Underrepresented Minority and White Students Between Comparison Years
A.25 Change in Science Advanced Placement Tests Taken per 1,000 11th and 12th Grade Students Between Comparison Years
A.26 Change in Science Advanced Placement Tests Scoring Above 3 per 1,000 11th and 12th Grade Students Between Comparison Years

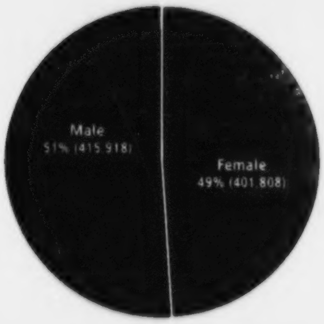
Exhibit A 1

Number of Students Enrolled in CPMSA Districts: SY 1993-94 to SY 2000-01[*1]

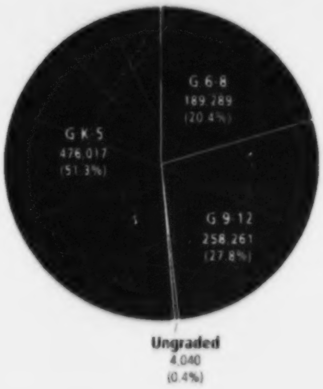


SY 2000-01

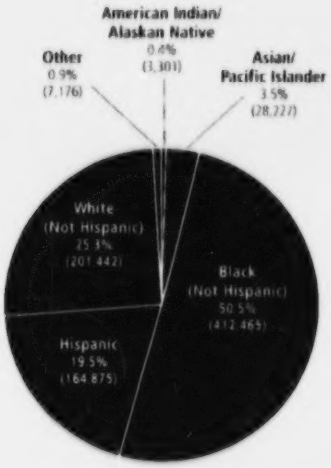
Gender[*2]



Grade Level[*3]



Race/Ethnicity[*2]



[*1] Data from Normandy and Newport News were imputed

[*2] Data from Akron, Kansas City, Newport News, Normandy and Paramount not available

[*3] Data from Denver, Jefferson and Normandy were imputed

Sources: TISC-2002, CDE 2002

Exhibit A.2

Number of Students and Schools in CPMSA Districts: SY 2000-01

		District Total		CPMSA Schools[*1]	
		Number of Schools	Number of Students	Number of Schools	Number of Students
Cohort 1993	Brownsville	46	41,057	46	41,057
	Chattanooga/Hamilton Cty.	88	40,558	88	40,558
	Normandy	11	5,388	11	5,388
Cohort 1994	Denver	112	66,997	112	66,997
	Jefferson Cty.	130	85,426	130	85,426[*2]
	Newport News	44	32,830	44	32,830
Cohort 1995	Birmigham	76	37,438	76	37,438
	Omaha	79	44,197	34	19,005[*2]
	Winston-Salem	67	44,018	22	17,566[*3]
Cohort 1996	East Side Union H.S.	11	24,282	11	24,282
	Jackson	56	31,235	56	31,235
	Newburgh Enlarged	14	12,255	14	12,255
	Paramount	17	16,862	17	16,862
	Prince George's Cty.	186	133,667	177	119,130[*3]
	Roanoke River Valley Consortium	36	15,475	36	15,475
Cohort 1997	Akron	60	29,701	60	29,701
	Gary	34	18,015	34	18,015
	Kansas City	41	20,763	41	20,763
	Laredo	30	22,547	30	22,547
	Oakland	87	53,702	87	53,702
	Richmond	56	25,939	56	25,939
	Springfield	46	26,503	46	26,503
Cohort 1998	Beaumont	30	20,798	30	20,798
	Dayton	42	19,787	38	17,307
	Little Rock	50	25,525	50	25,525
	Montgomery	61	32,642	44	14,857
Total		1,510	927,607	1,390	841,161

[*1] CPMSA Schools: Schools that are receiving direct initiative services

[*2] Data imputed based on proportion of total enrollment

[*3] Data imputed from CDE-2000, CDE-2001, CDE-2002

Sources: TISC-2002, CDE-2002, CDE-2001, CDE-2000

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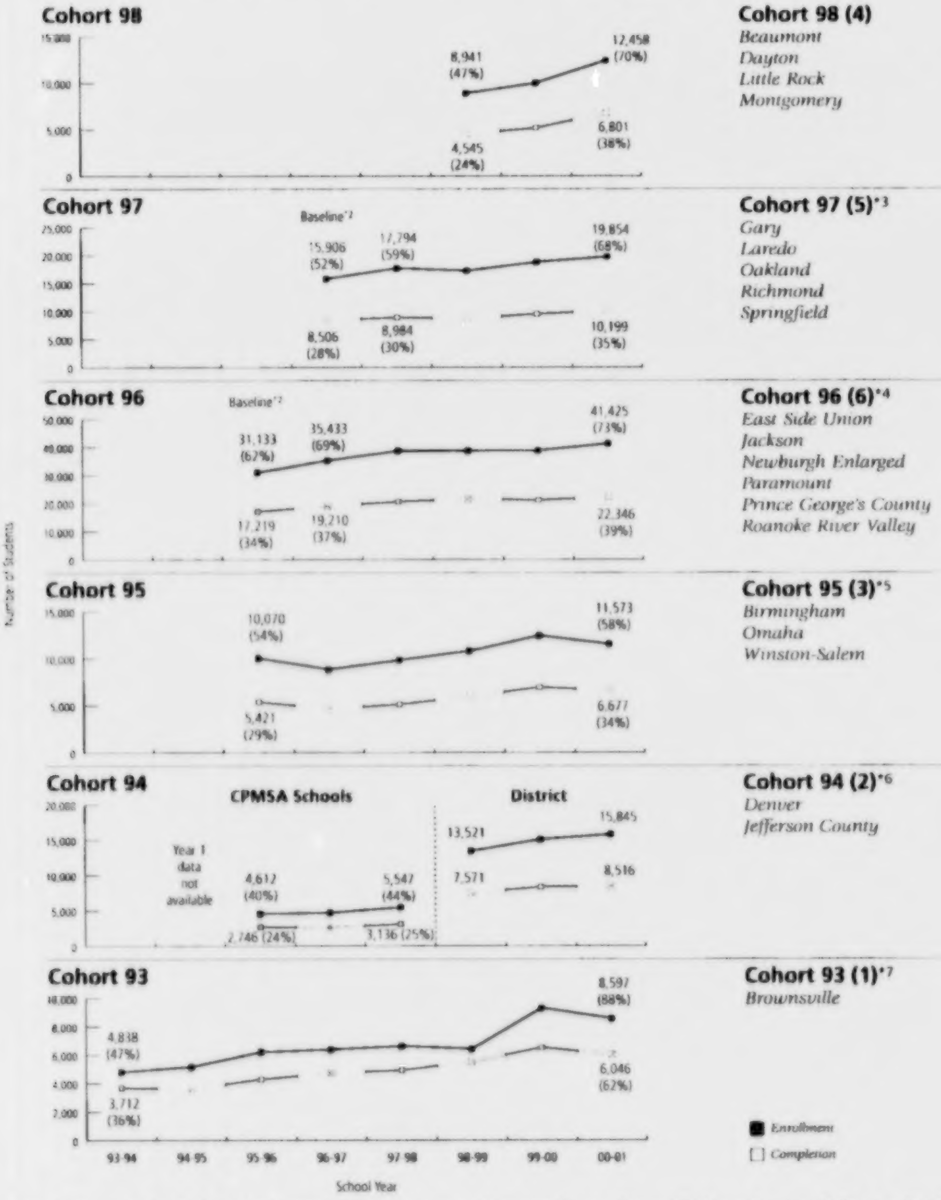
Exhibit A.3

Underrepresented Minority Students' Enrollment and Completion in G9-12 Mathematics Gate-Keeping and Higher-Level Courses from Year 1 to SY 2000-01[*1]



(%) Percentage of total G9-12 underrepresented minority student population who enrolled in and successfully completed (grade 'C' or above) gate-keeping or higher-level courses.

[*1] Mathematics gate-keeping and higher-level courses include Algebra I & II, Geometry, Trig/Pre-Calculus and Calculus.

[*2] Baseline Year: Year prior to CPMSA implementation.

[*3] Akron and Kansas City are not included because less than three years of enrollment and completion data are available. Data were imputed for Springfield SY 1996-97 student population.

[*4] Data were imputed for Paramount SY 2000-01 student population and East Side SY 1995-96 student population.

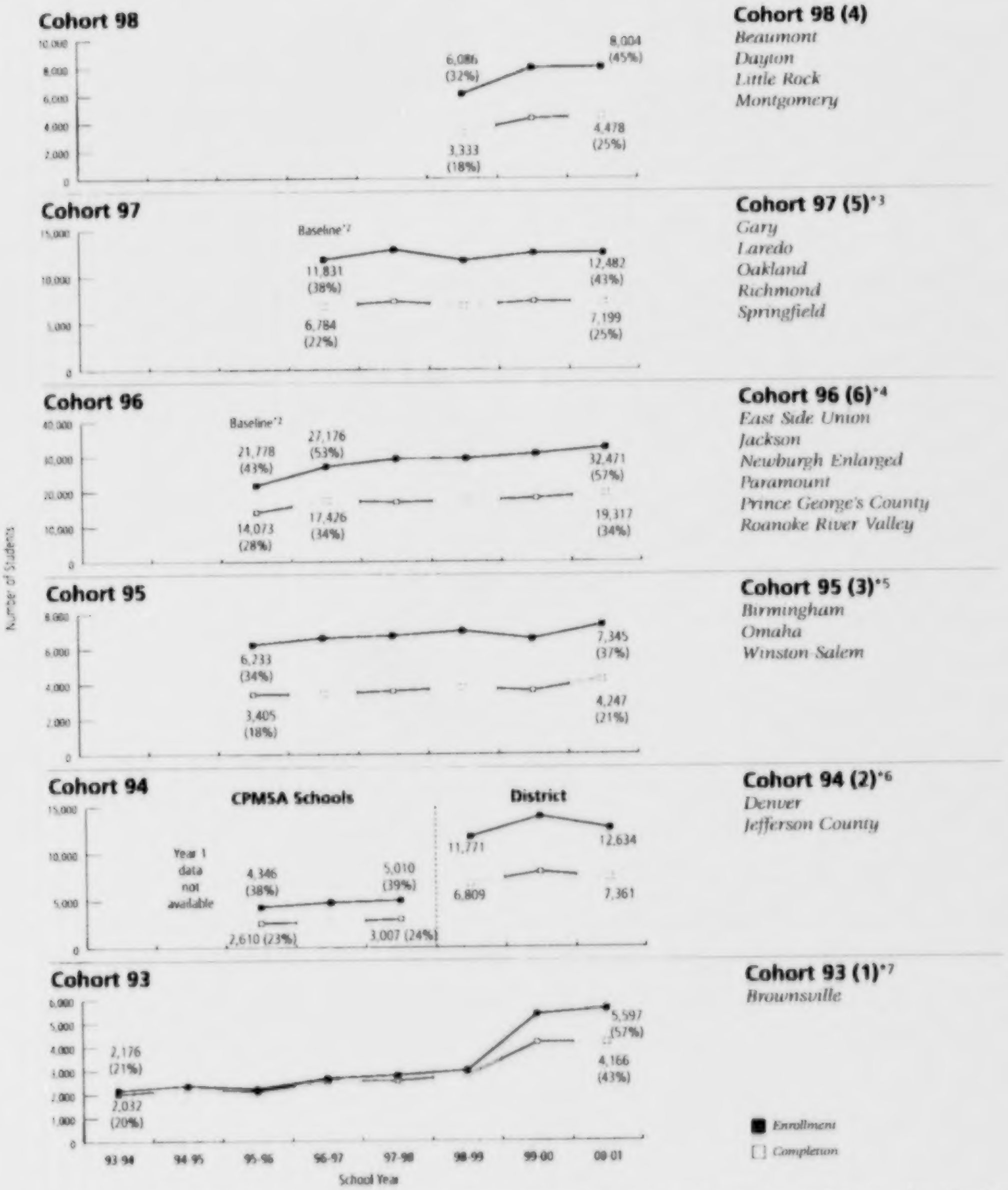
[*5] Data were imputed for Omaha SY 2000-01 enrollment and completion totals.

[*6] Data for CPMSA Schools only collected prior to SY 1998-99; District-wide data collected beginning in SY 1998-99. Newport News is not included because not enough enrollment and completion data are available.

[*7] Chattanooga/Hamilton County and Normandy are not included because not enough enrollment and completion data are available.

Exhibit A.4

Underrepresented Minority Students' Enrollment and Completion in G9-12 Science Gate-Keeping and Higher-Level Courses from Year 1 to SY 2000-01[*1]



(%) Percentage of total G9-12 underrepresented minority student population who enrolled in and successfully completed (grade 'C' or above) gate-keeping or higher-level courses.

[*1] Science gate-keeping and higher-level courses include Biology I, Chemistry I, and Physics I.

[*2] Baseline Year: Year prior to CPMSA implementation.

[*3] Akron and Kansas City are not included because less than three years of enrollment and completion data are available. Data were imputed for Springfield SY 1996-97 student population and Richmond SY 1996-97, 1997-98 enrollment and 1996-97 completion totals.

[*4] Data were imputed for Paramount SY 2000-01 student population.

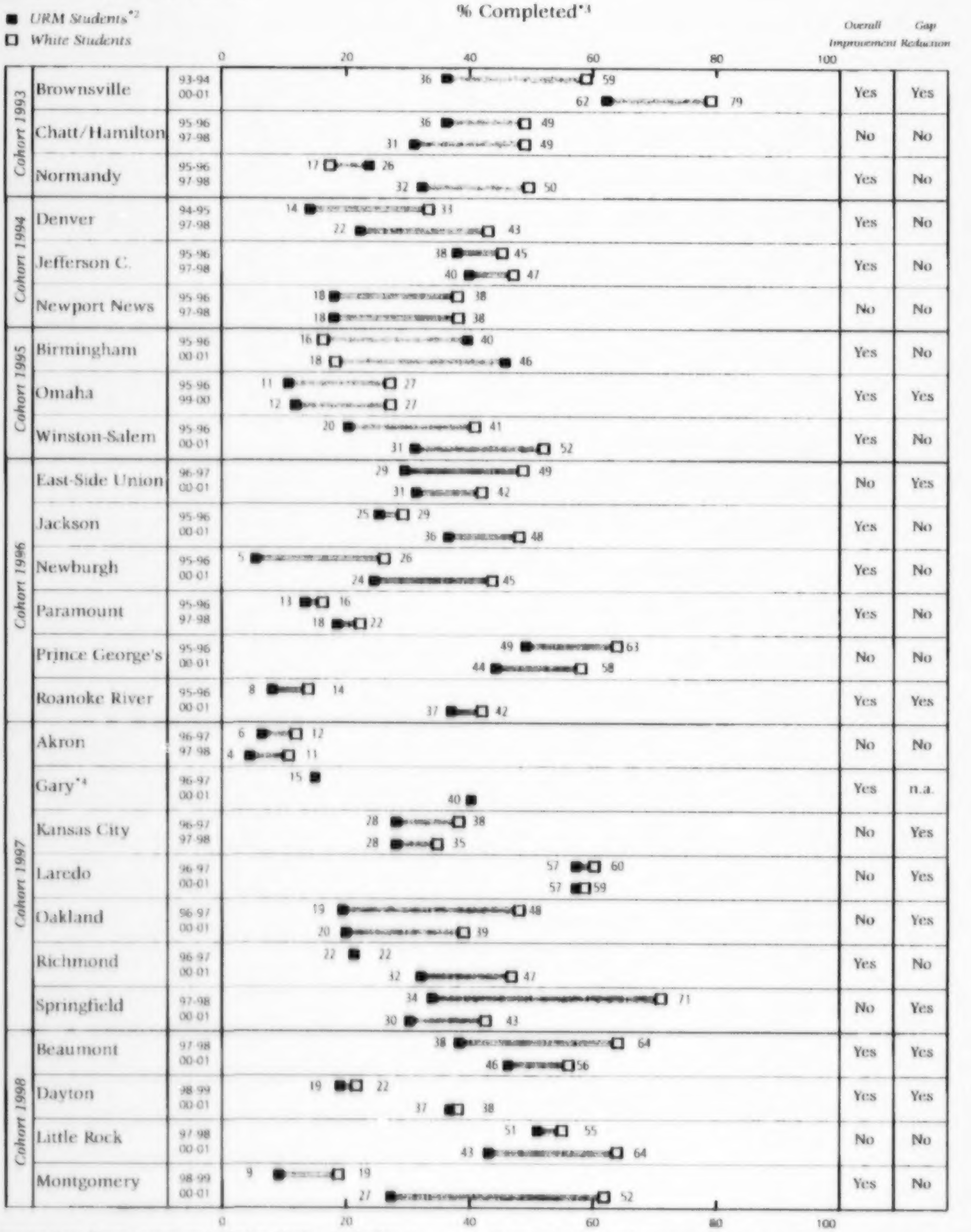
[*5] Data were imputed for Omaha SY 2000-01 enrollment and completion totals.

[*6] Data for CPMSA Schools only collected prior to SY 1998-99; District-wide data collected beginning in SY 1998-99. Newport News is not included because not enough enrollment and completion data are available.

[*7] Chattanooga/Hamilton County and Normandy are not included because not enough enrollment and completion data are available.

Exhibit A.5

G9-12 Gate-Keeping and Higher-Level Mathematics Course Completion Percentage and Gap Among Underrepresented Minority and White Students Between Comparison Years[*1]

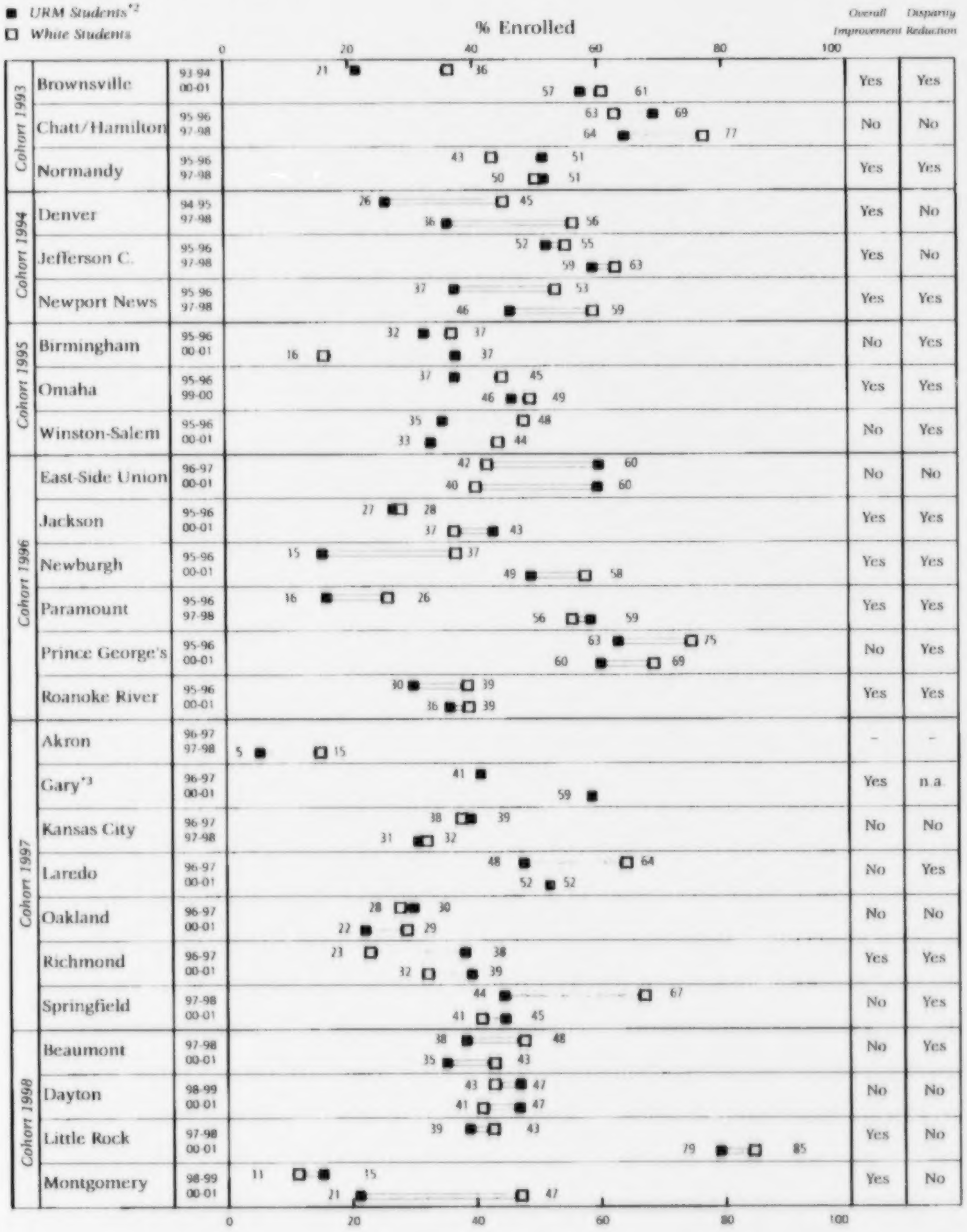


Mathematics Gate-Keeping courses includes Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus, and Calculus
n.a.: not applicable

[*1] Includes first and most recent years available
[*2] URM includes American Indian, Black, and Hispanic students
[*3] Successful Completion percentage
[*4] Comparison not presented if Whites < 2% of the total population

Exhibit A.6

G9-12 Gate-Keeping and Higher-Level Science Course Enrollment Percentage and Disparity Among Underrepresented Minority and White Students Between Comparison Years[1]



Science Gate-Keeping courses includes Biology, Chemistry and Physics

n.a.: not applicable

[1] Includes first and most recent years available

[2] URM includes American Indian, Black, and Hispanic students

[3] Comparison not presented if Whites < 2% of the total population

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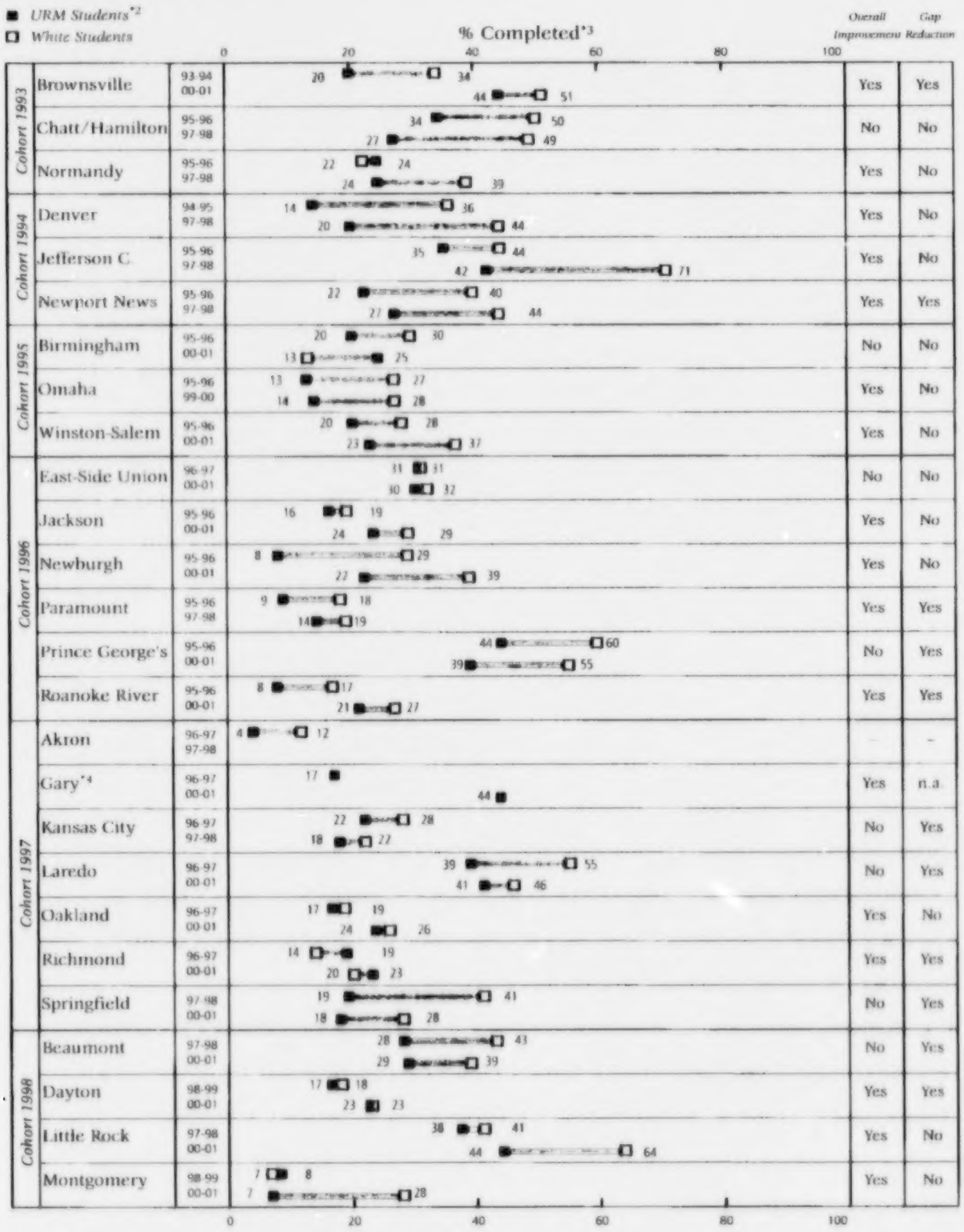
Exhibit A.7

G9-12 Gate-Keeping and Higher-Level Science Course Completion Percentage and Gap Among Underrepresented Minority and White Students Between Comparison Years*1



Science Gate-Keeping courses includes Biology, Chemistry and Physics

n.a.: not applicable

*1 Includes first and most recent years available

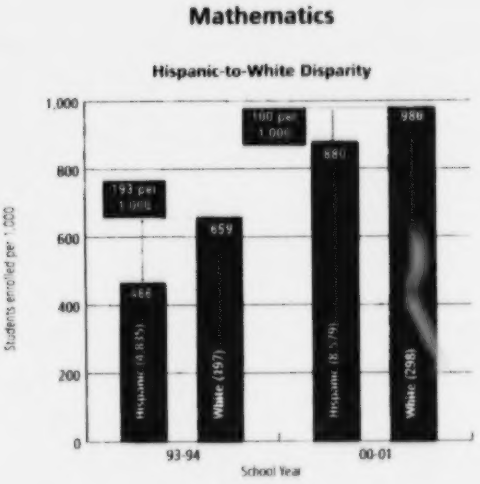
*2 URM includes American Indian, Black, and Hispanic students

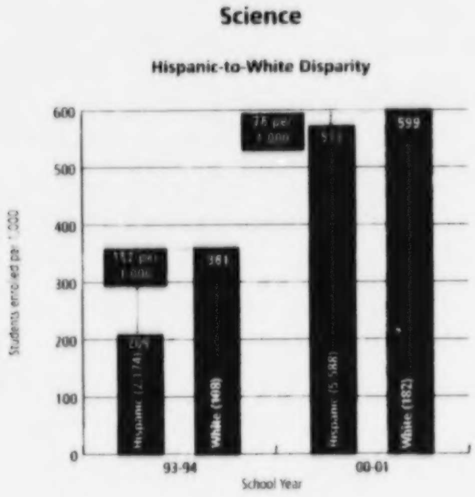
*3 Successful Completion percentage

*4 Comparison not presented if Whites < 2% of the total population

Exhibit A.8

Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1993-94 to SY 2000-01: Cohort 1993 (Brownsville)





( ) Indicates the total enrollment

Example: In SY 1993-94, 4,835 Hispanic students enrolled in mathematics gate-keeping and higher level courses, which represents a rate of 466 per one thousand students. In SY 2000-01, the number of Hispanic students enrolled in mathematics gate-keeping and higher level courses increased to 8,579 (880 per 1,000).

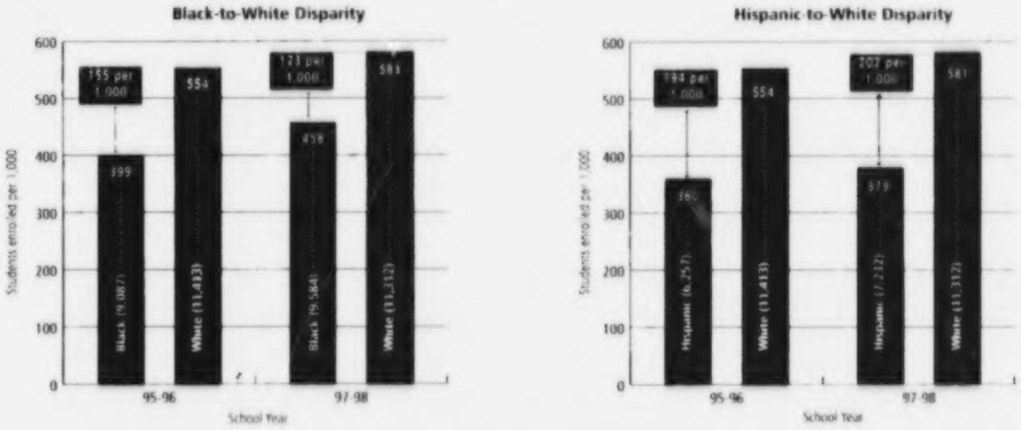
Notes:
- Mathematics gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus.
- Science Gate-keeping courses include Biology, Chemistry and Physics.

Source: TISC-2002

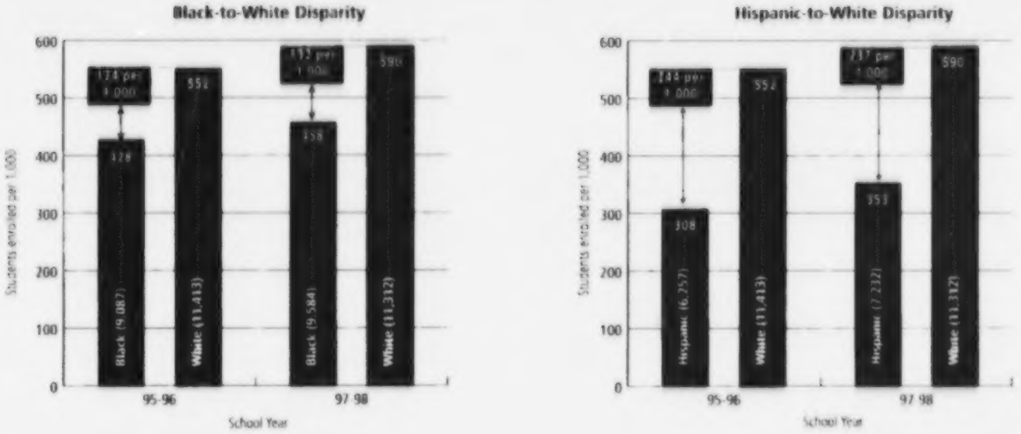
Exhibit A.9

Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1995-96 to SY 1997-98: Cohort 1994 (Denver, Jefferson County, and Newport News)

Mathematics



Science



( ) Indicates the total enrollment

Example: In SY 1995-96, 9,087 Black students enrolled in mathematics gate-keeping and higher level courses, which represents a rate of 399 per 1,000 students. In SY 1997-98, the number of Black students enrolled in mathematics gate-keeping and higher level courses increased to 9,584 (458 per 1,000)

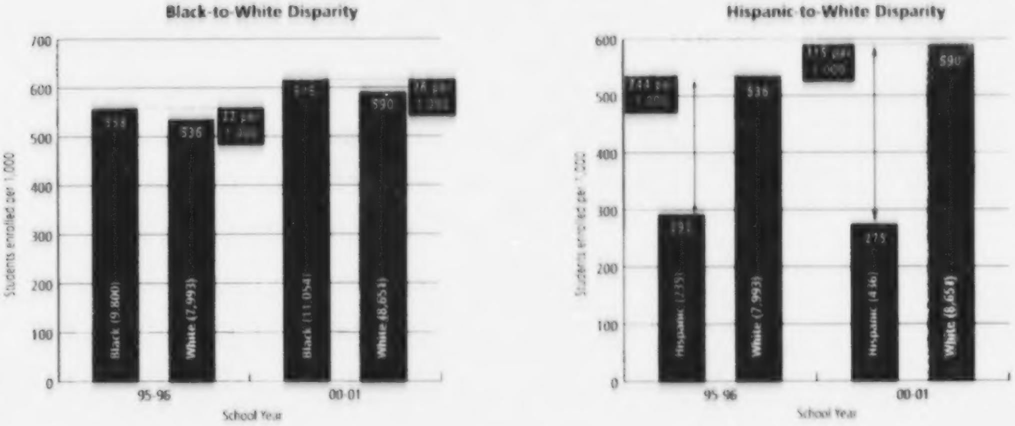
Notes:
- Mathematics Gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus
- Science Gate-keeping courses include Biology, Chemistry and Physics

Source: TISC-2002

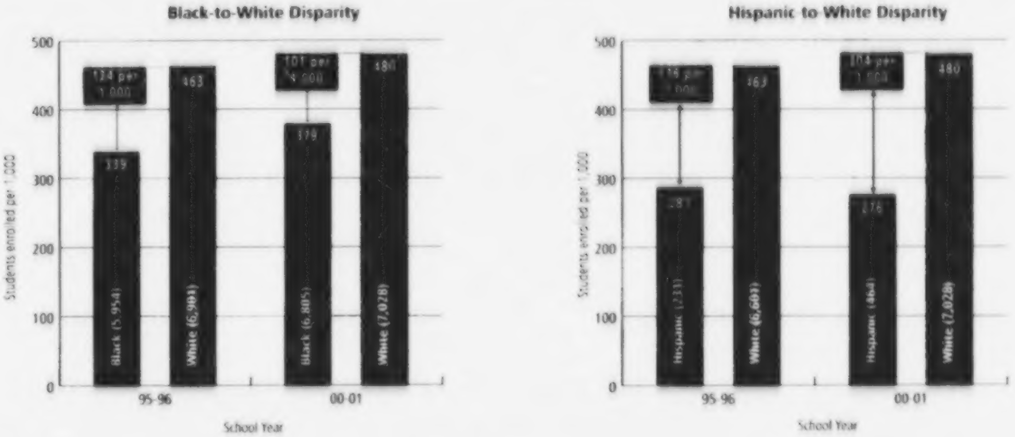
Exhibit A.10

Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1995-96 to SY 2000-01: Cohort 1995 (Birmingham, Omaha, and Winston-Salem)

Mathematics



Science



( ) Indicates the total enrollment

Example: In SY 1995-96, 9,800 Black students enrolled in mathematics gate-keeping and higher level courses, which represents a rate of 558 per 1,000 students. In SY 2000-01, the number of Black students enrolled in mathematics gate-keeping and higher level courses increased to 11,054 (616 per 1,000)

Notes:
- Enrollment and completion data imputed for Omaha SY 2000-01
- Mathematics Gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus
- Science Gate-keeping courses include Biology, Chemistry and Physics

Source: TISC 2002

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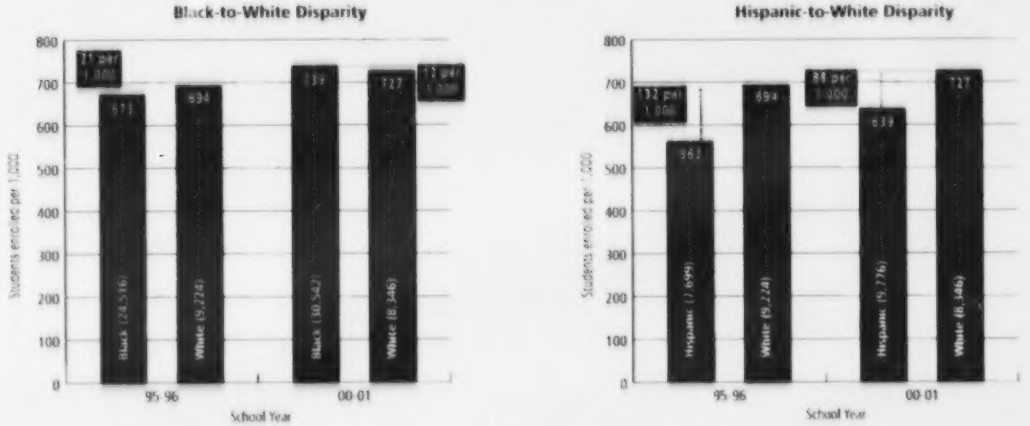
Exhibit A 11

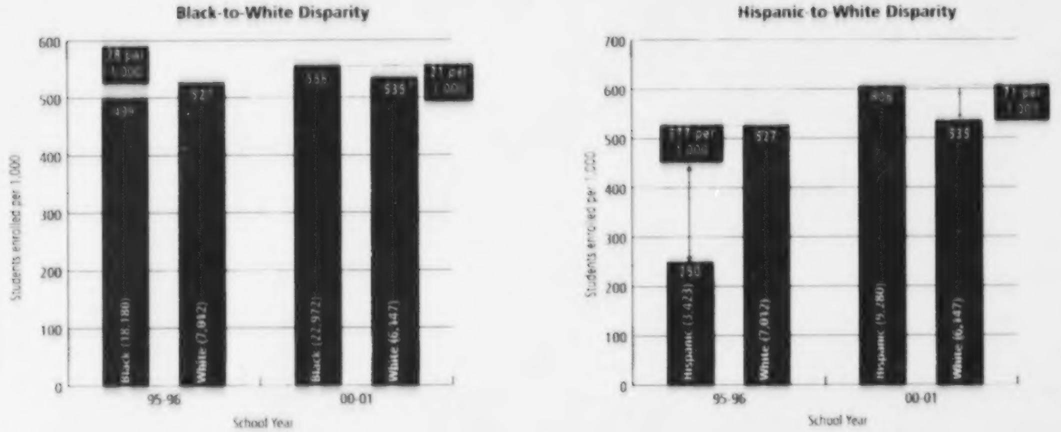
Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1995-96 to SY 2000-01: Cohort 1996 (East Side Union, Jackson, Newburgh, Paramount, Prince George's County, and Roanoke River Valley)

Mathematics


Black-to-White Disparity

Hispanic-to-White Disparity

Science


Black-to-White Disparity

Hispanic-to-White Disparity

( ) Indicates the total enrollment

Example: In SY 1995-96, 24,516 Black students enrolled in mathematics gate-keeping and higher level courses, which represents a rate of 673 per one thousand students. In SY 2000-01, the number of Black students enrolled in mathematics gate-keeping and higher level courses increased to 30,542 (739 per 1,000).

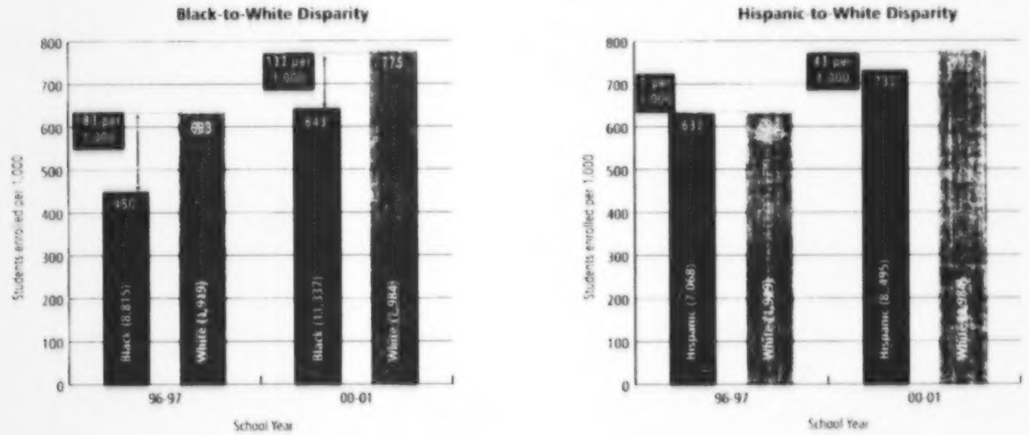
Notes:
- Mathematics Gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus
- Science Gate-keeping courses include Biology, Chemistry and Physics

Source: TISC 2002

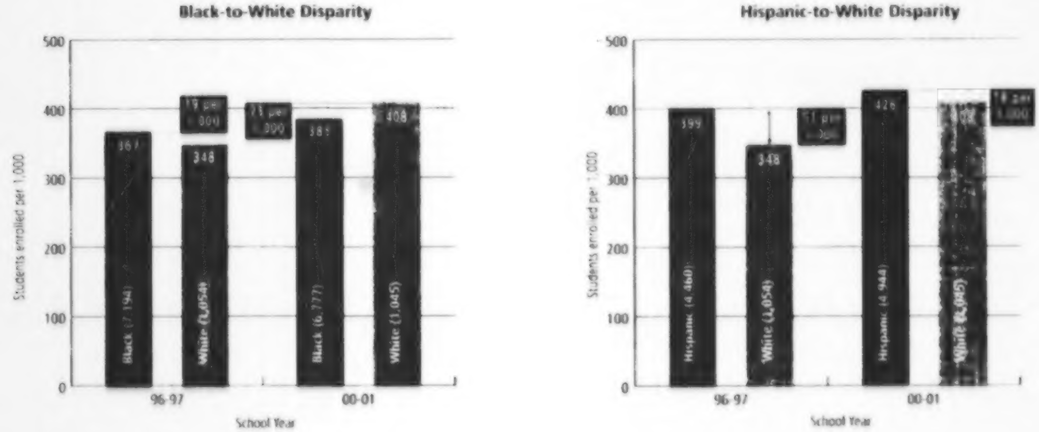
Exhibit A.12

Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1996-97 to SY 2000-01: Cohort 1997 (Gary, Laredo, Oakland, Richmond, and Springfield)

Mathematics



Science



( ) Indicates the total enrollment

Example: In SY 1996-97, 8,815 Black students enrolled in mathematics gate keeping and higher level courses, which represents a rate of 450 per one thousand students. In SY 2000-01, the number of Black students enrolled in mathematics gate-keeping and higher level courses increased to 11,337 (643 per 1,000).

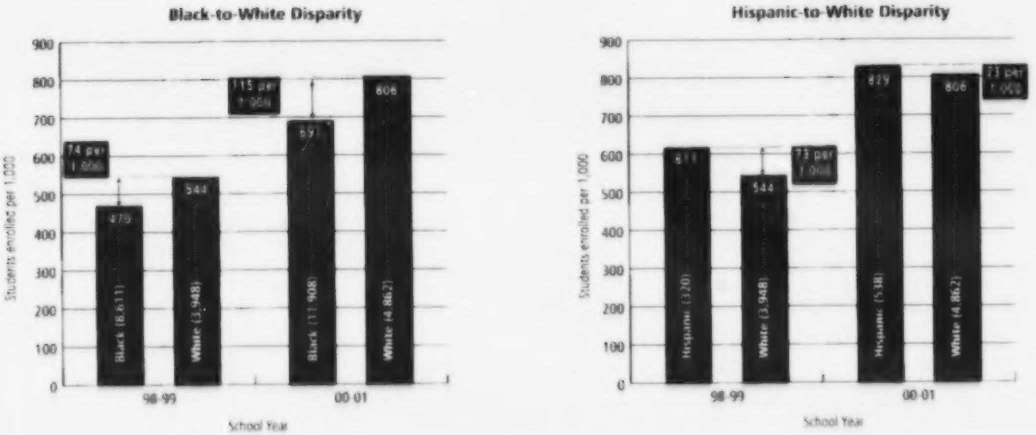
Notes:
- Mathematics Gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus.
- Science Gate-keeping courses include Biology, Chemistry and Physics.

Source: TISC-2002

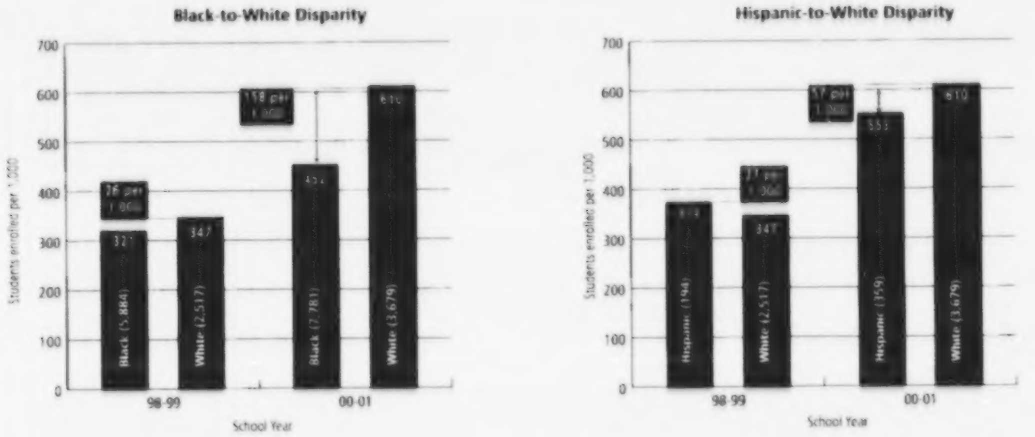
Exhibit A.13

Enrollment Disparity Trends in Grades 9-12 Mathematics and Science Gate-Keeping Courses from SY 1998-99 to SY 2000-01: Cohort 1998 (Beaumont, Dayton, Little Rock, and Montgomery)

Mathematics



Science



( ) Indicates the total enrollment

Example: In SY 1998-99, 8,611 Black students enrolled in mathematics gate-keeping and higher level courses, which represents a rate of 470 per one thousand students. In SY 2000-01, the number of Black students enrolled in mathematics gate keeping and higher level courses increased to 11,908 (691 per 1,000).

Notes:
- Mathematics Gate-keeping courses include Algebra I, Algebra II, Geometry, Trigonometry/Pre-Calculus and Calculus.
- Science Gate-keeping courses include Biology, Chemistry and Physics.

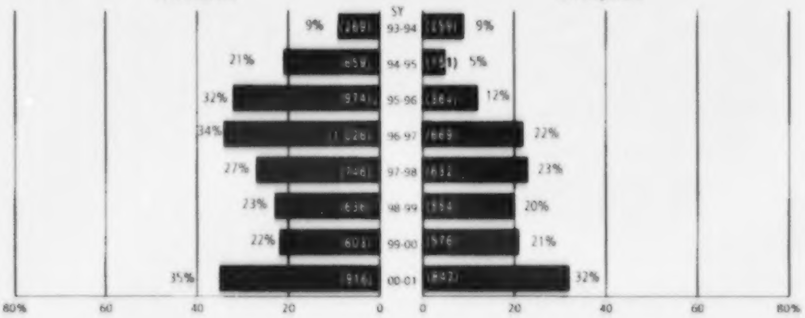
Source: TISC-2002

[illegible] HAV [illegible] To [illegible]

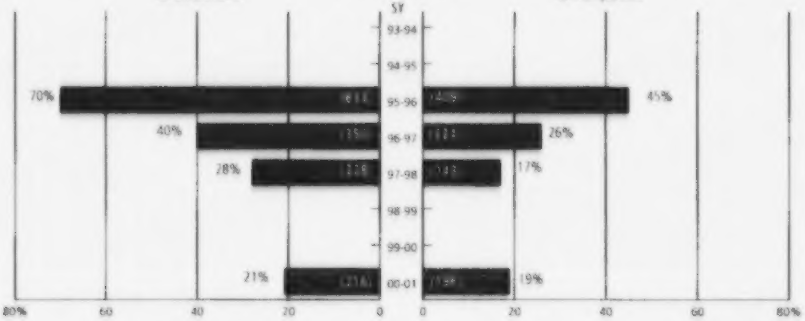
Exhibit A.14

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1993-94 to SY 2000-01: Cohort 93 Sites (Brownsville, Chattanooga, and Normandy)

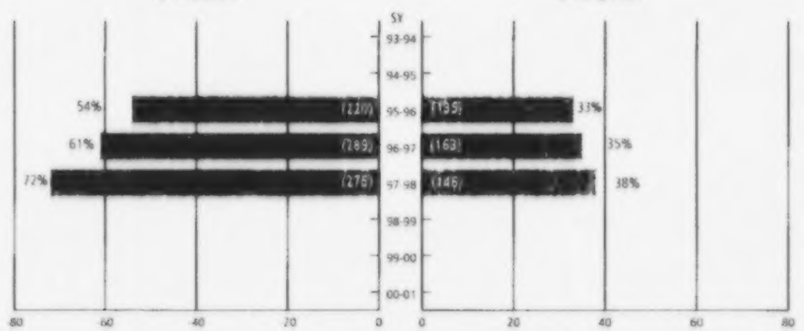
Brownsville



Chattanooga



Normandy



Example: In SY 1993-94, 9% (269 of 2,857) of the underrepresented minority 8th grade students enrolled in Algebra I and 9% of students (259 of the 2,857) successfully completed with a grade 'C' or above.

% Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

(#) Number of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

Note: Baseline data not available for any site in Cohort 93. Data not available for Chattanooga SY 1993-95 and SY 1998-00 and Normandy in SY 1993-95 and SY 1998-01

Source: TISC-2002

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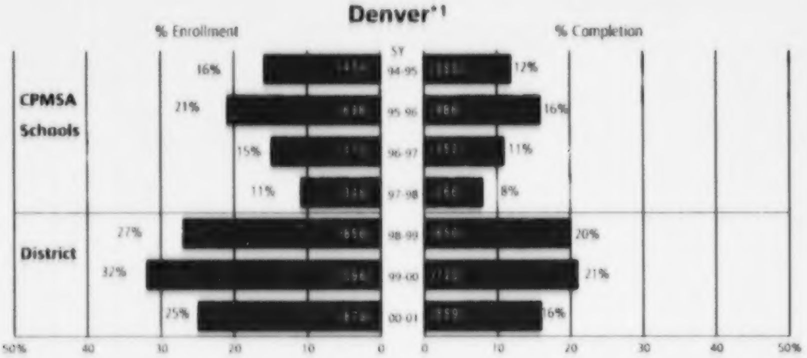
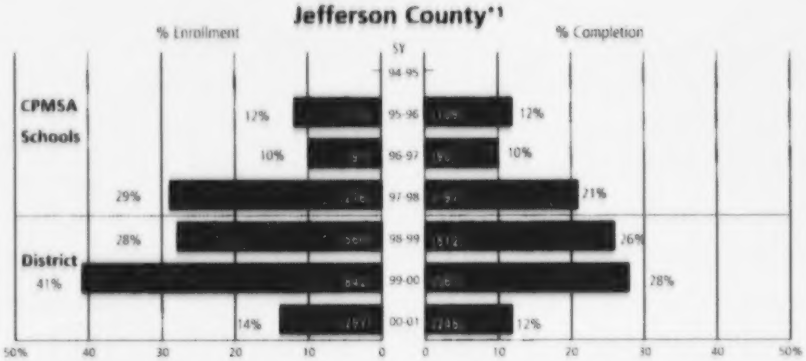
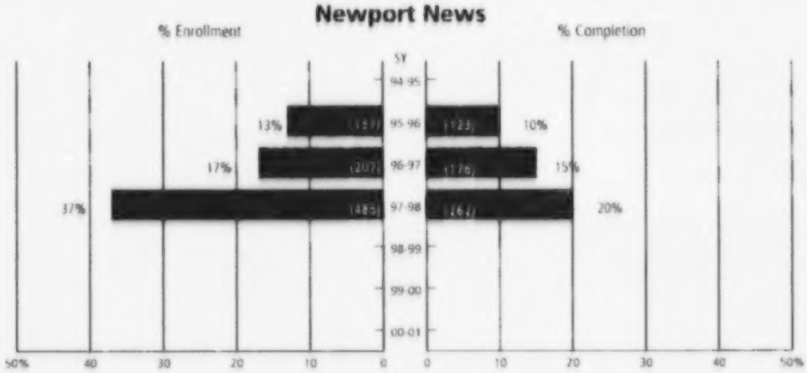
Exhibit A.15

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1994-95 to SY 2000-01: Cohort 94 Sites (Denver, Jefferson County, and Newport News)


Denver*1


Jefferson County*1


Newport News

Example: In SY 1994-95, 16% (474 of 2,771) of the underrepresented minority 8th grade students enrolled in Algebra I and 12% of students (355 of the 2,771) successfully completed with a grade 'C' or above.

% Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

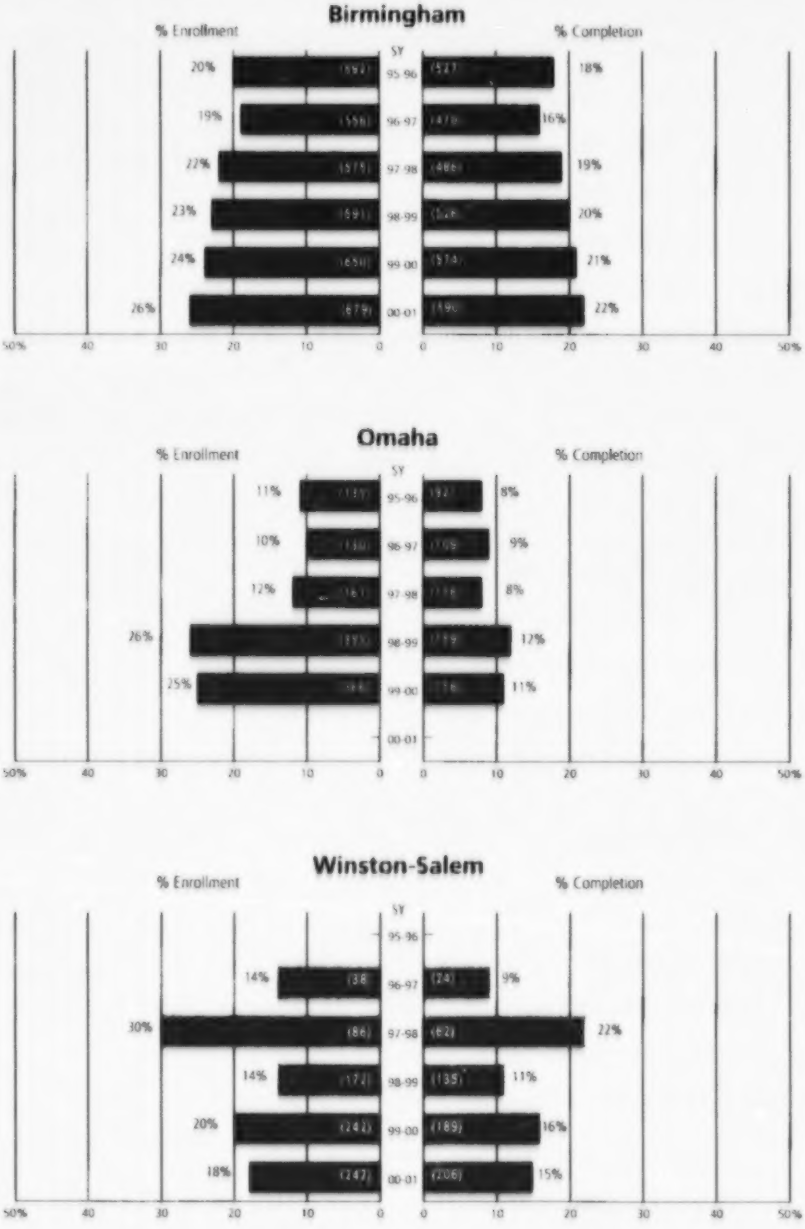
(#) Number of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

Note: *1 Data for CPMSA Schools only collected prior to SY 1998-99; District-wide data collected beginning in SY 1998-99. Baseline data not available. Data not available for Jefferson County or Newport News for SY 1994-95. Data not available for Newport News from SY 1998-99 to 2000-01.

Source: TISC-2002

Exhibit A.16

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1995-96 to SY 2000-01: Cohort 95 Sites (Birmingham, Omaha, and Winston-Salem)



Example: In SY 1995-96, 20% (592 of 2,903) of the underrepresented minority 8th grade students enrolled in Algebra I and 18% of students (527 of the 2,903) successfully completed with a grade 'C' or above

% Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

(#) Number of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

Note: Baseline data not available for any site in Cohort 95. Data not available for Omaha in SY 2000-01 and Winston-Salem in SY 1995-96

Source: TISC-2002

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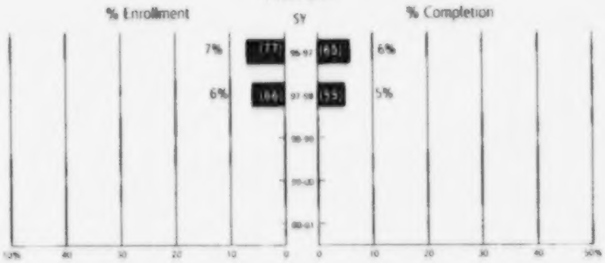
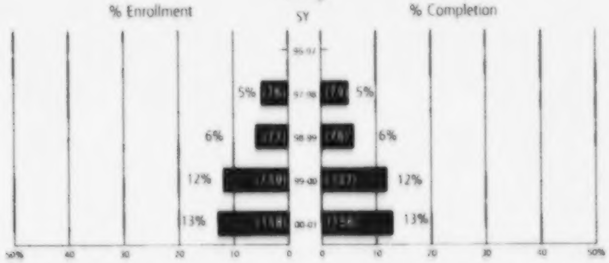
Exhibit A.17

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1996-97 to SY 2000-01: Cohort 97 Sites (Akron, Gary, Kansas City, Laredo, Oakland, Richmond, and Springfield)

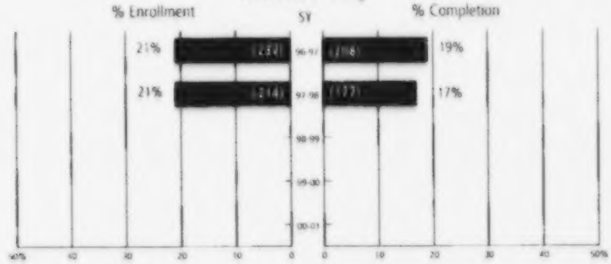
Akron



Gary



Kansas City



Laredo

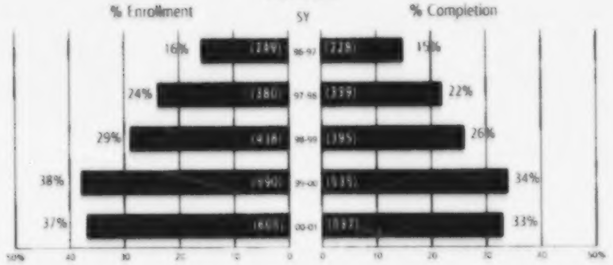
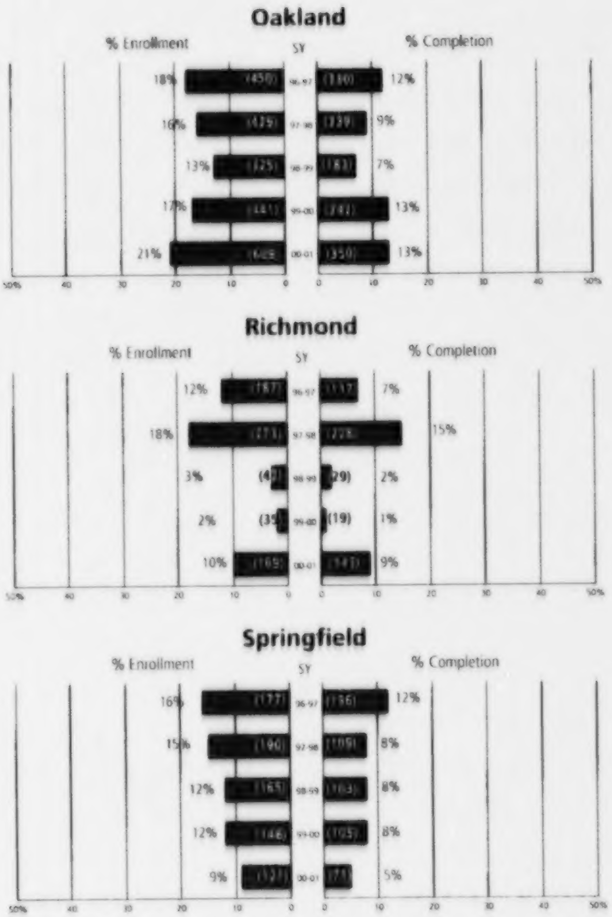


Exhibit A.17 (continued)



Example: In SY 1995-96, 7% (77 of 1,051) of the underrepresented minority 8th grade students enrolled in Algebra I and 6% of students (65 of the 1,051) successfully completed with a grade 'C' or above.
%: Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I
(#): Number of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I
Note: Data not available for Akron or Kansas City from SY 1998-99 to 2000-01. Data not available for Gary SY1996-97 (baseline year).
Source: TISC 2002

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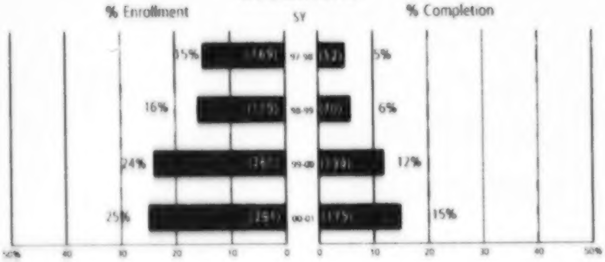
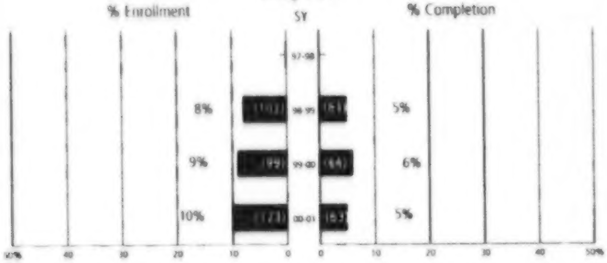
Exhibit A.18

Underrepresented Minority Student Enrollment and Successful Completion in Algebra I in 8th Grade from SY 1997-98 to SY 2000-01: Cohort 98 Sites (Beaumont, Dayton, Little Rock, and Montgomery)

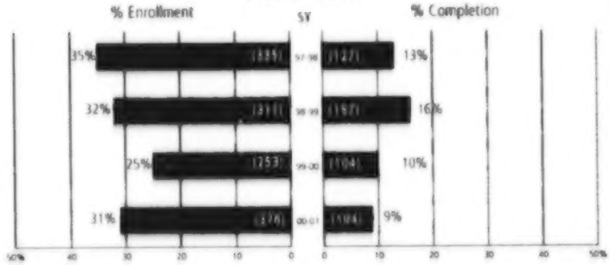
Beaumont



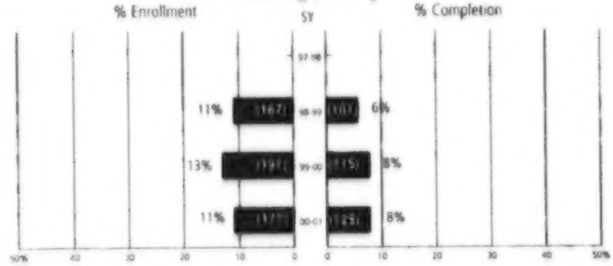
Dayton



Little Rock



Montgomery



Example: In SY 1997-98, 15% (169 of 1,106) of the underrepresented minority 8th grade students enrolled in Algebra I and 5% of students (52 of the 1,051) successfully completed with a grade 'C' or above

%: Percent of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

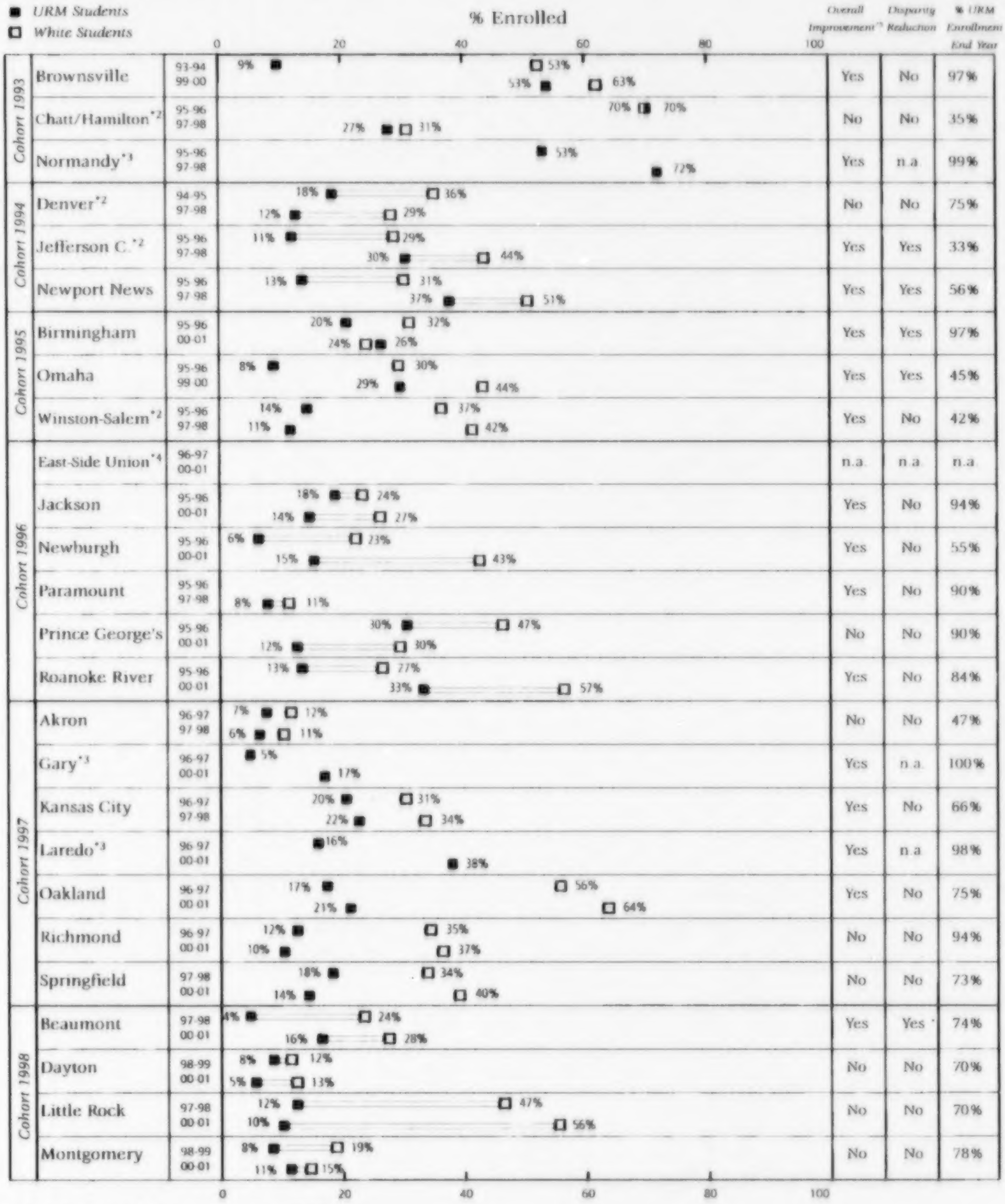
(#): Number of URM 8th grade students enrolled in or successfully completing (grade 'C' or above) Algebra I

Note: Baseline data not available for Dayton and Montgomery

Source: TISC-2002

Exhibit A.19

Algebra I in 8th Grade Enrollment: Disparity Among Largest Underrepresented Minority and White Students Between Comparison Years*1



Cohort	District	Year	■ URM Students	□ White Students	Overall Improvement*5	Disparity Reduction	% URM Enrollment End Year
Cohort 1993	Brownsville	93-94	9%	53%	Yes	No	97%
		99-00	53%	63%			
	Chatt/Hamilton*2	95-96	70%	70%	No	No	35%
		97-98	27%	31%			
	Normandy*3	95-96	53%		Yes	n.a.	99%
		97-98	72%				
Cohort 1994	Denver*2	94-95	18%	36%	No	No	75%
		97-98	12%	29%			
	Jefferson C.*2	95-96	11%	29%	Yes	Yes	33%
		97-98	30%	44%			
	Newport News	95-96	13%	31%	Yes	Yes	56%
		97-98	37%	51%			
Cohort 1995	Birmingham	95-96	20%	32%	Yes	Yes	97%
		00-01	26%	24%			
	Omaha	95-96	8%	30%	Yes	Yes	45%
		99-00	29%	44%			
	Winston-Salem*2	95-96	14%	37%	Yes	No	42%
		97-98	11%	42%			
Cohort 1996	East-Side Union*4	96-97			n.a.	n.a.	n.a.
		00-01					
	Jackson	95-96	18%	24%	Yes	No	94%
		00-01	14%	27%			
	Newburgh	95-96	6%	23%	Yes	No	55%
		00-01	15%	43%			
	Paramount	95-96			Yes	No	90%
		97-98	8%	11%			
	Prince George's	95-96	30%	47%	No	No	90%
		00-01	12%	30%			
	Roanoke River	95-96	13%	27%	Yes	No	84%
		00-01	33%	57%			
Cohort 1997	Akron	96-97	7%	12%	No	No	47%
		97-98	6%	11%			
	Gary*3	96-97	5%		Yes	n.a.	100%
		00-01	17%				
	Kansas City	96-97	20%	31%	Yes	No	66%
		97-98	22%	34%			
	Laredo*3	96-97	16%		Yes	n.a.	98%
		00-01	38%				
	Oakland	96-97	17%	56%	Yes	No	75%
		00-01	21%	64%			
	Richmond	96-97	12%	35%	No	No	94%
		00-01	10%	37%			
	Springfield	97-98	18%	34%	No	No	73%
		00-01	14%	40%			
Cohort 1998	Beaumont	97-98	4%	24%	Yes	Yes	74%
		00-01	16%	28%			
	Dayton	98-99	8%	12%	No	No	70%
		00-01	5%	13%			
	Little Rock	97-98	12%	47%	No	No	70%
		00-01	10%	56%			
	Montgomery	98-99	8%	19%	No	No	78%
		00-01	11%	15%			

*1 Includes first and most recent years available.

*2 CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in SY 1998-99. Only encompassed schools presented

*3 Comparison not presented if Whites < 2% of the total population

*4 Eastside Union High School does not have 8th grade

*5 Overall Improvement is based on increased enrollment rates for students of all races and ethnicities

n.a. not applicable

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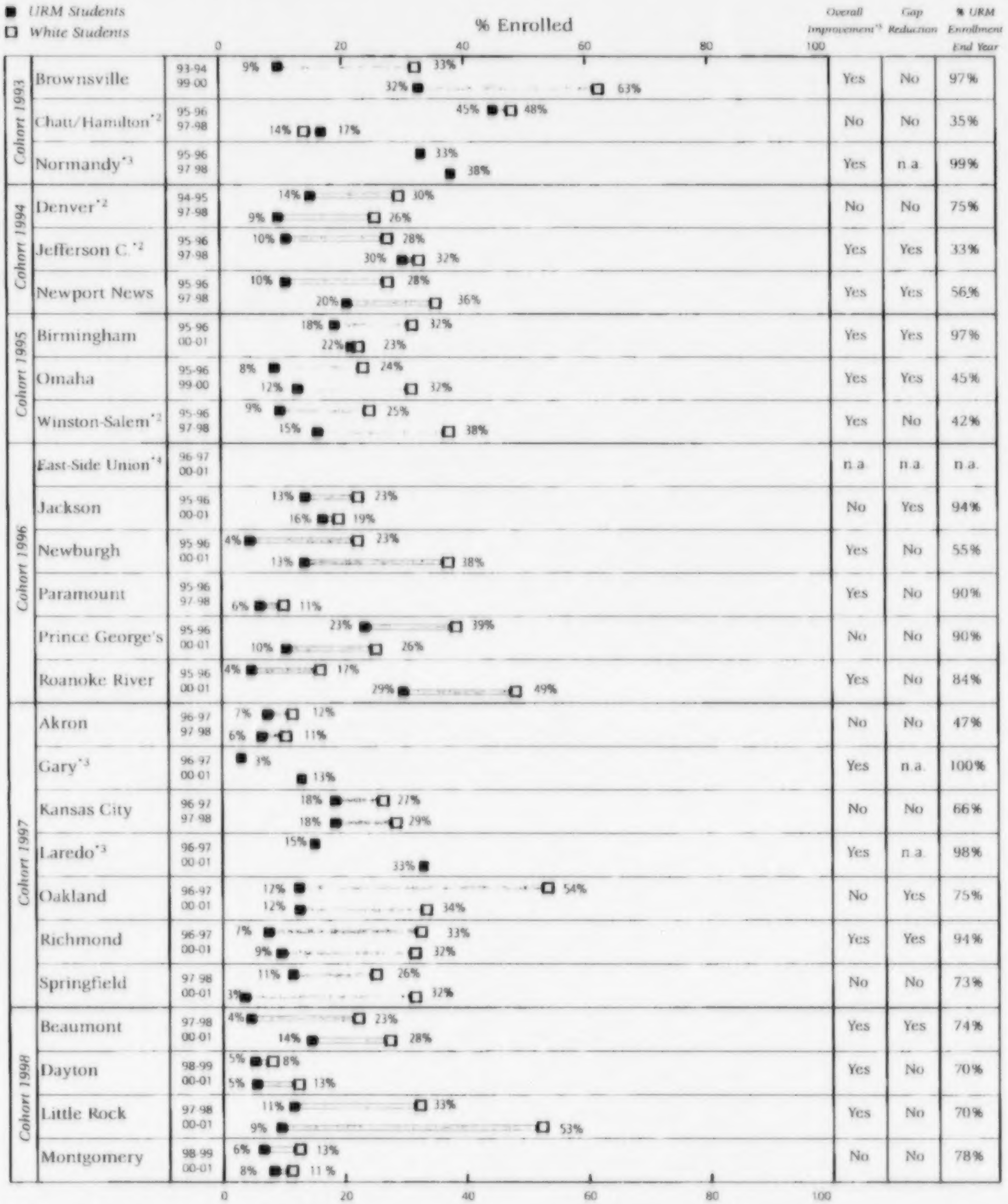
Exhibit A.20

Algebra I in 8th Grade Completion: Gap Among Largest Underrepresented Minority and White Students Between Comparison Years*1



Cohort	District	Years	■ URM Students	☐ White Students	Overall Improvement*5	Gap Reduction	% URM Enrollment End Year
Cohort 1993	Brownsville	93-94 99-00	9% 32%	33% 63%	Yes	No	97%
	Chatt/Hamilton*2	95-96 97-98	45% 17%	48% 14%	No	No	35%
	Normandy*3	95-96 97-98	33% 38%		Yes	n.a.	99%
Cohort 1994	Denver*2	94-95 97-98	14% 9%	30% 26%	No	No	75%
	Jefferson C.*2	95-96 97-98	10% 30%	28% 32%	Yes	Yes	33%
	Newport News	95-96 97-98	10% 20%	28% 36%	Yes	Yes	56%
Cohort 1995	Birmingham	95-96 00-01	18% 22%	32% 23%	Yes	Yes	97%
	Omaha	95-96 99-00	8% 12%	24% 32%	Yes	Yes	45%
	Winston-Salem*2	95-96 97-98	9% 15%	25% 38%	Yes	No	42%
Cohort 1996	East-Side Union*4	96-97 00-01			n.a.	n.a.	n.a.
	Jackson	95-96 00-01	13% 16%	23% 19%	No	Yes	94%
	Newburgh	95-96 00-01	4% 13%	23% 38%	Yes	No	55%
	Paramount	95-96 97-98	 6%	 11%	Yes	No	90%
	Prince George's	95-96 00-01	23% 10%	39% 26%	No	No	90%
	Roanoke River	95-96 00-01	4% 29%	17% 49%	Yes	No	84%
Cohort 1997	Akron	96-97 97-98	7% 6%	12% 11%	No	No	47%
	Gary*3	96-97 00-01	3% 13%		Yes	n.a.	100%
	Kansas City	96-97 97-98	18% 18%	27% 29%	No	No	66%
	Laredo*3	96-97 00-01	15% 33%		Yes	n.a.	98%
	Oakland	96-97 00-01	12% 12%	54% 34%	No	Yes	75%
	Richmond	96-97 00-01	7% 9%	33% 32%	Yes	Yes	94%
	Springfield	97-98 00-01	11% 3%	26% 32%	No	No	73%
Cohort 1998	Beaumont	97-98 00-01	4% 14%	23% 28%	Yes	Yes	74%
	Dayton	98-99 00-01	5% 5%	8% 13%	Yes	No	70%
	Little Rock	97-98 00-01	11% 9%	33% 53%	Yes	No	70%
	Montgomery	98-99 00-01	6% 8%	13% 11%	No	No	78%

[*1] Includes first and most recent years available

[*2] CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in SY 1998-99. Only encompassed schools presented

[*3] Comparison not presented if Whites < 2% of the total population

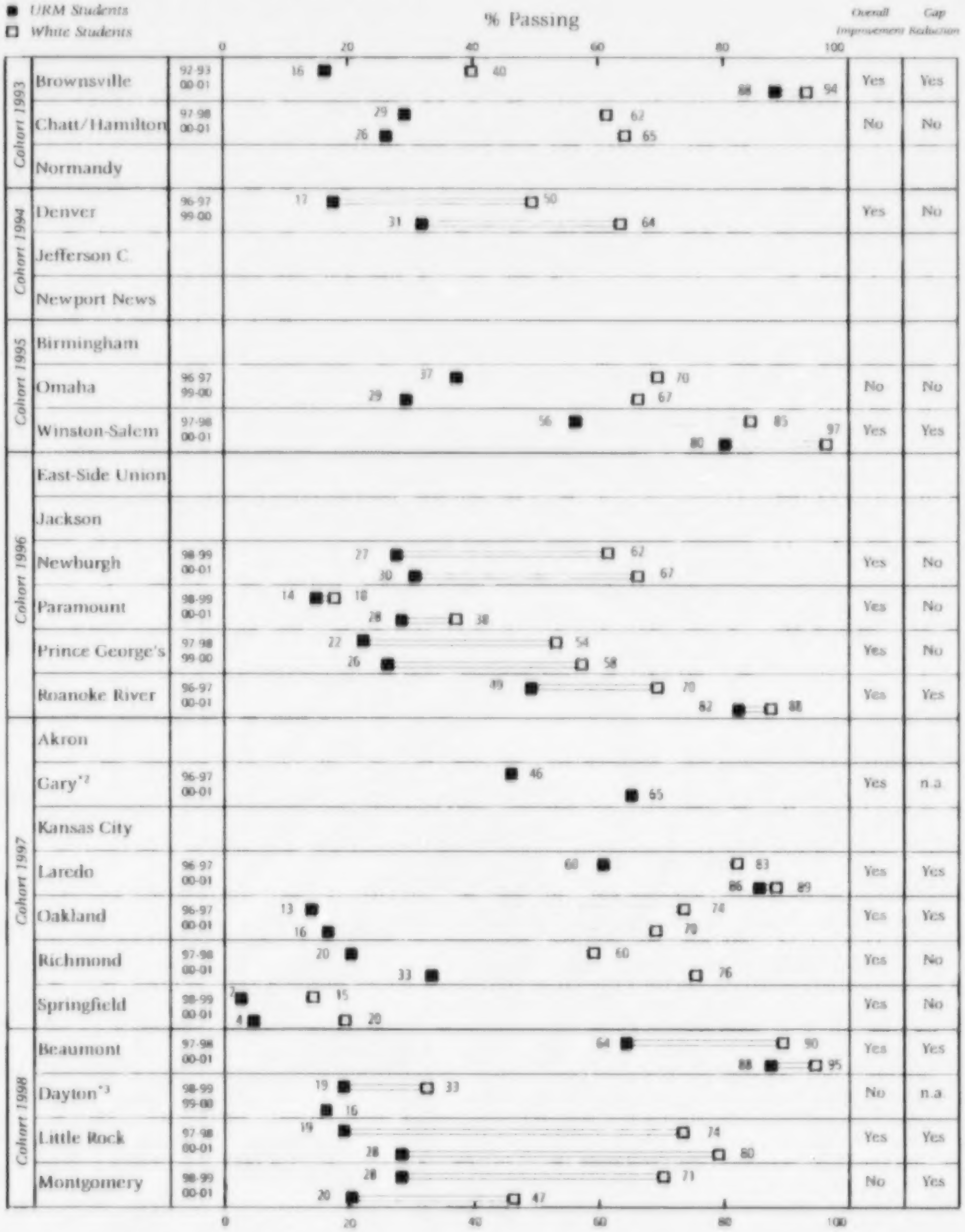
[*4] Eastside Union High School does not have 8th grade

[*5] Overall Improvement is based on increased enrollment rates for students of all races and ethnicities

n.a.: not applicable

Exhibit A.21

8th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years*1



Example: In Winston-Salem, 56% of the largest minority group (Black) and 70% of White students passed the NCEGT/ECT in 1997-98. In 2000-01, 80% of Black and 97% of White students passed the NCEGT/ECT. Thus, the gap decreased from 29 to 17 percentage points.

*1 Includes first and most recent years available.

*2 Comparison not presented if Whites < 2% of the total population.

*3 6th Grade data shown

n.a.: not applicable

Source: TISC 2002

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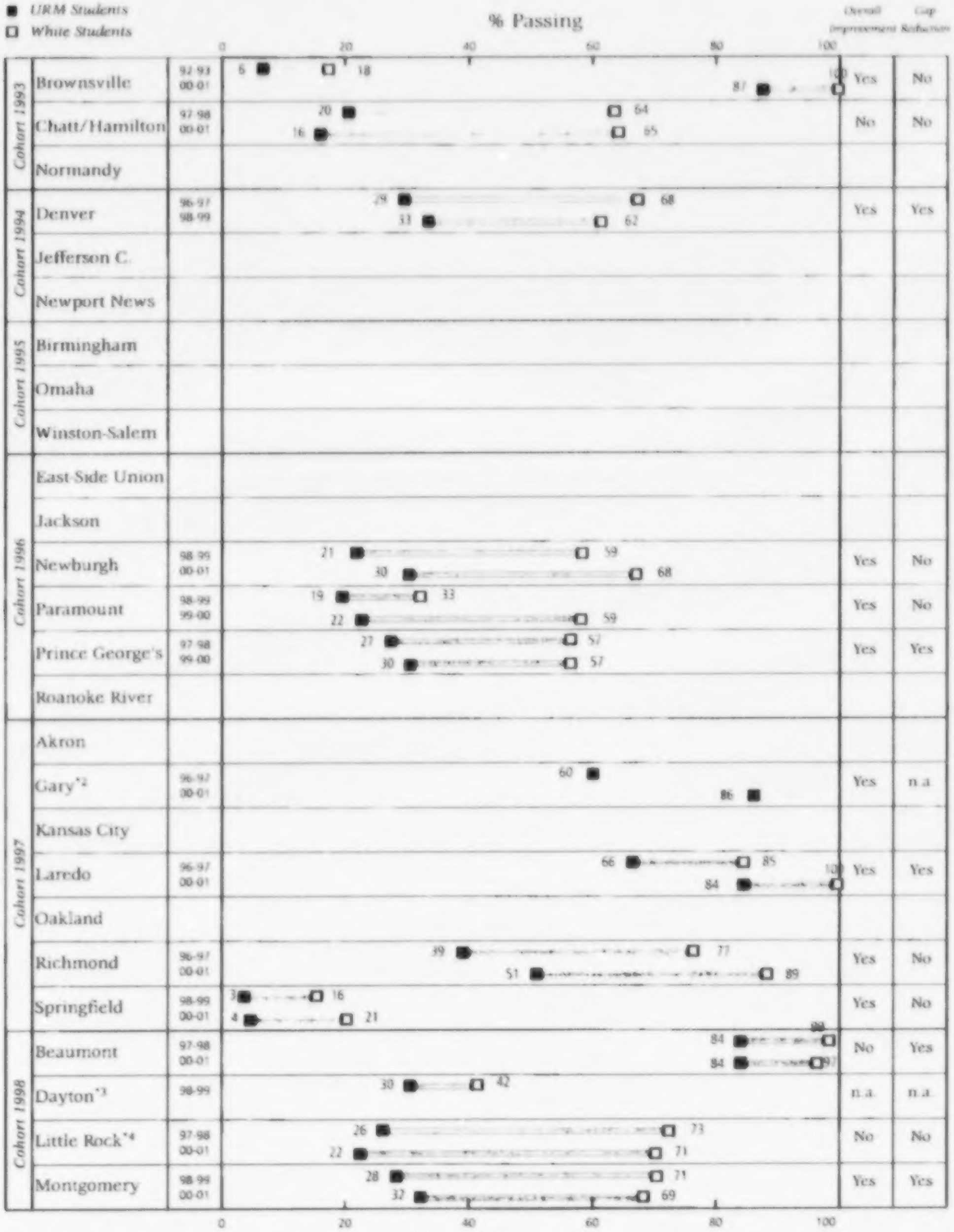
Exhibit A.22

8th Grade Science Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years[1]



Example: In Laredo, 66% of the largest minority group (Hispanic) and 84% of White students passed the Texas Assessment of Academic Skills (TAAS) in 1996-97. In 2000-01, 84% of Hispanic and 100% of White students passed TAAS. Thus, the gap decreased from 19 to 16 percentage points.

*1 Includes first and most recent years available.

*2 Comparison not presented if Whites < 2% of the total population.

*3 6th Grade data shown. Complete data only available for SY 1998-99.

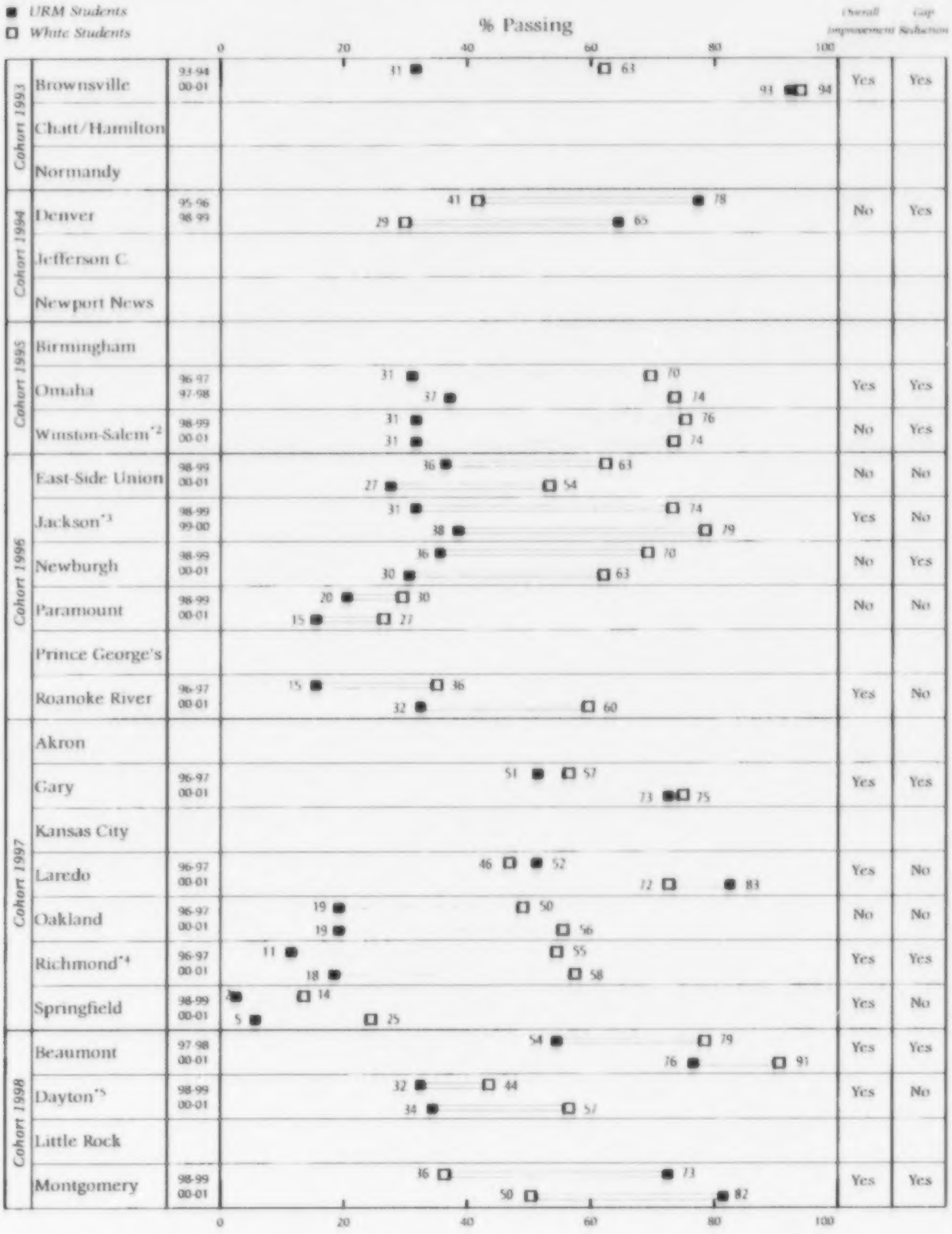
*4 7th Grade data shown.

n.a.: not applicable

Source: TISC-2002

Exhibit A.23

10th Grade Mathematics Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years[*1]



Example: In Beaumont, 54% of the largest minority group (Black) and 79% of White students passed the TAAS in 1997-98. In 2000-01, 76% of Black and 91% of White students passed the TAAS. Thus, the gap decreased from 25 to 15 percentage points.

[*1] Includes first and most recent years available.

[*2] End of Course Geometry test for G9-G12

[*3] 11th Grade data shown.

[*4] State assessment test for G9-G11

[*5] 12th Grade data shown

Source: TISC 2002

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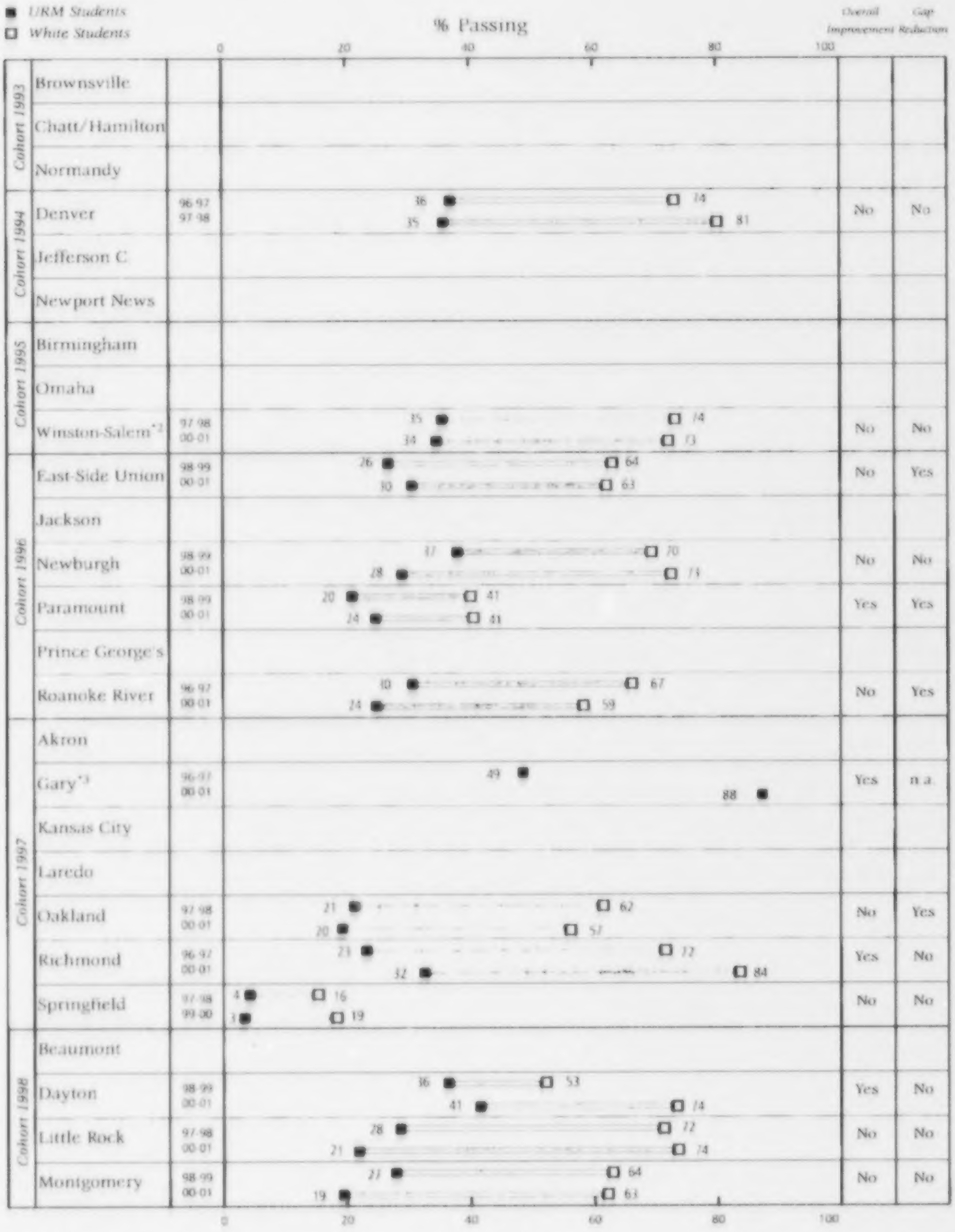
Exhibit A.24

10th Grade Science Assessment Test Gap Among Passing Rates of Largest Minority Group and White Students Between Comparison Years*1



Example: In Paramount, 20% of the largest minority group (Hispanic) and 41% of White students passed the Stanford 9 (SAT-9) in 1998-99. In 2000-01, 24% of Black and 41% of White students passed the SAT-9. Thus, the gap decreased from 21 to 17 percentage points.

[*1] Includes first and most recent years available.

[*2] End of Course Biology test for G9 - G12.

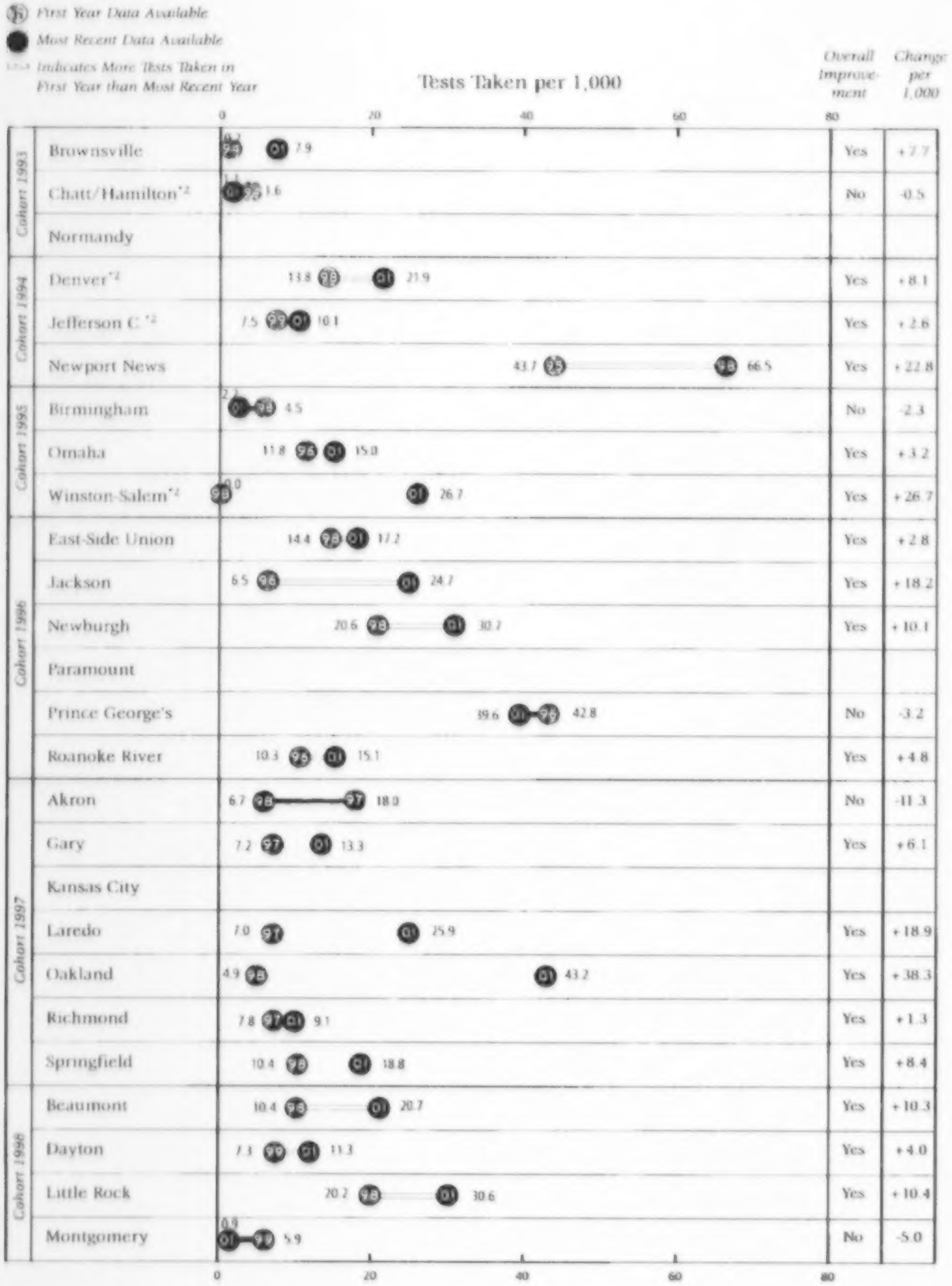
[*3] Comparison not presented if Whites < 2% of population.

n.a.: not applicable

Source: TISC-2002

Exhibit A.25

Science Advanced Placement Tests Taken Per 1,000 11th and 12th Grade Students Between Comparison Years[*1]



[*1] Includes first and most recent years available

[*2] CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in 1998-99. Only encompassed schools presented

n.a.: not applicable

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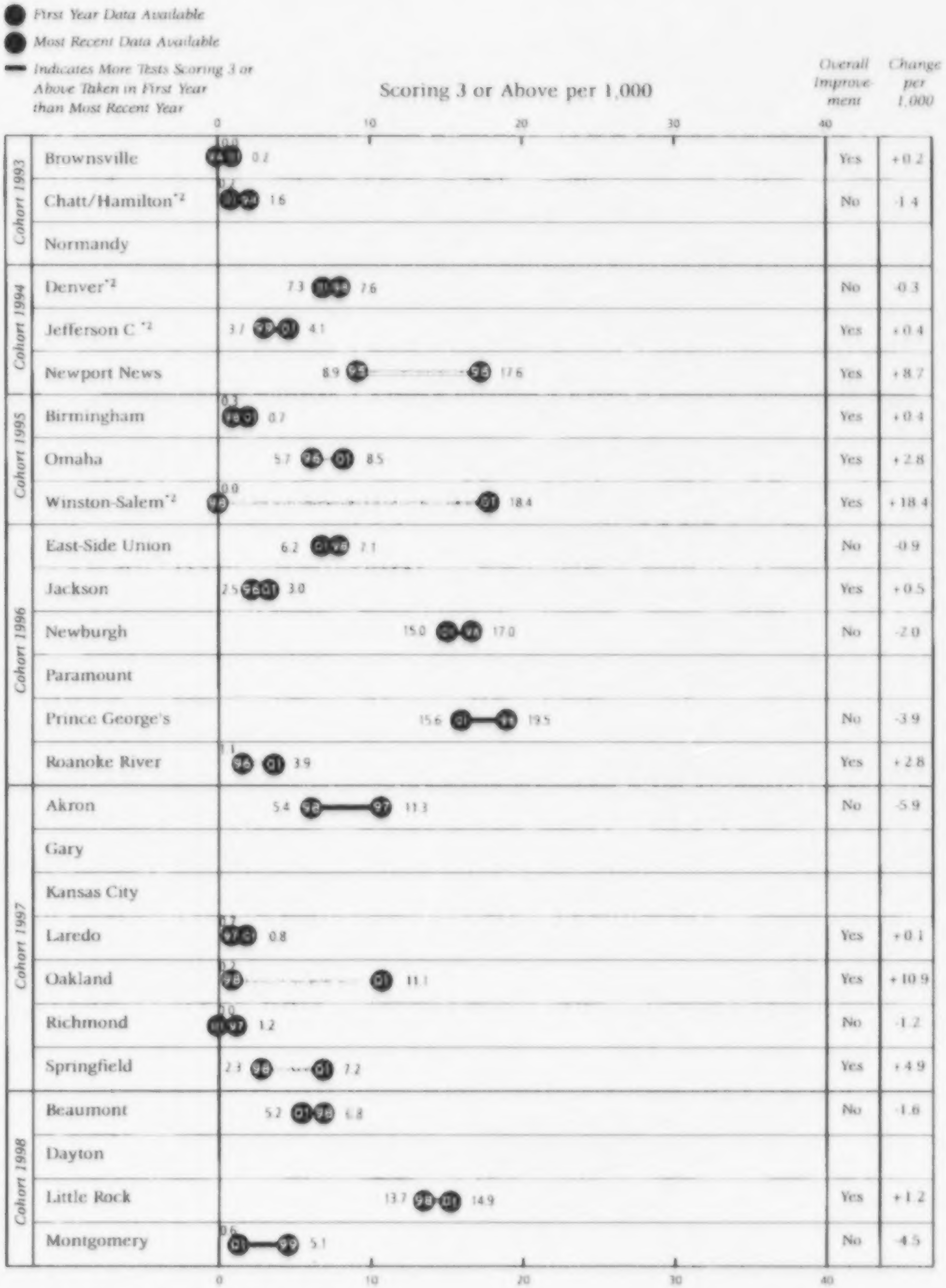
Exhibit A 26

Science Advanced Placement Tests Scoring 3 or Above Per 1,000 11th and 12th Grade Students Between Comparison Years*1



*1 Includes first and most recent years available.

*2 CPMSA project encompassed selected schools until SY 1997-98 and the entire district starting in 1998-99. Only encompassed schools presented.

n.a. not applicable

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DENVER SCHOOL DISTRICT

OMAHA SCHOOL DISTRICT

PROJECT SUCCESS CONSORTIUM

BIRMINGHAM SCHOOL DISTRICT

WINSTON-SALEM SCHOOL DISTRICT

NEWBURGH ENLARGED CITY SCHOOL DISTRICT

PARAMOUNT UNIFIED SCHOOL DISTRICT

ROANOKE RIVER VALLEY CONSORTIUM

EAST SIDE UNION HIGH SCHOOL DISTRICT

JACKSON PUBLIC SCHOOL DISTRICT

PRINCE GEORGE'S COUNTY SCHOOL DISTRICT

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KANSAS CITY PUBLIC SCHOOLS

OAKLAND UNIFIED SCHOOL DISTRICT

AKRON PUBLIC SCHOOLS

LAREDO INDEPENDENT SCHOOL DISTRICT

GARY COMMUNITY SCHOOL CORPORATION

SPRINGFIELD PUBLIC SCHOOLS

BEAUMONT INDEPENDENT SCHOOL DISTRICT

DAYTON PUBLIC SCHOOLS

LITTLE ROCK SCHOOL DISTRICT

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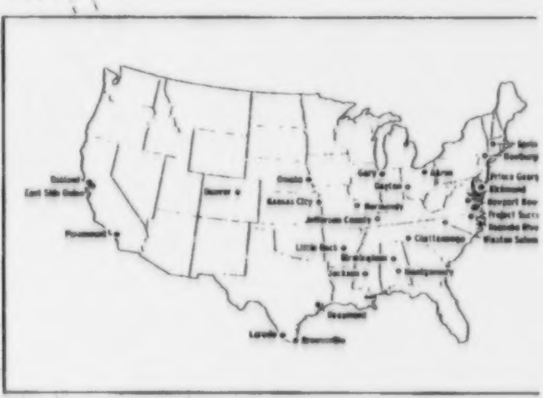
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